State Water Commission, Joint Subcommittee Meeting
Basement Conference Room (SWC Staff Only)
900 E. Boulevard Ave.
Bismarck, North Dakota
November 10 - 1:00 p.m. CT
A QUORUM OF THE COMMISSION MAY BE PRESENT

REMOTE/CALL-IN INFORMATION
Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
+1 701-328-0950; Passcode 384241668#

AGENDA

A. Roll Call

B. SWC Secretary Update (no attachment)
   1. Meeting Efficiencies (no attachment)

C. Southwest Pipeline Project
   1. REM Reimbursement Request
   2. 2022 Water Rates

D. Northwest Area Water Supply (no attachments)
   1. South Prairie Reservoir and Hydraulic Control Structure (NAWS Contract 5-1A)
   2. Interim Water Supply Agreement with Minot

E. Cost-Share Updates
   1. Policy Modifications - CLOMR Acquisition and Loan Requests
   2. WebGrants Update (no attachment)

F. Flood Control

1.	Neche – Levee Certification Project	PC
2.	Maple River WRD - Cass County Drain No. 37 Improvement	PC
3.	Maple River WRD - Cornell Township Drainage Improvement District No. 80	PC
4.	Southeast Cass WRD - 2021-2022 Sheyenne River Snagging and Clearing	C
5.	Southeast Cass WRD - 2021-2022 Wild Rice River Snagging and Clearing	C

G. General Water

1.	Pembina County WRD - Tongue River NRCS Watershed Plan	PC

H. Water Supply

1.	Garrison Diversion Conservancy District – Red River Valley Water Supply Water Infrastructure Loan	C
2.	WAWSA – MCWRD System I North Expansion	C

I. Federal MR&I Water Supply

1.	Garrison Diversion Conservancy District - ENDAWS	PC
2.	Five-Year Plan	O

PC	Pre-Construction
C	Construction
L	Legislative
CI	Cost Increase
O	Other

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MEMORANDUM

TO: Subcommittee members
FROM: Sindhuja S.Pillai-Grinolds, SWPP Project Manager
SUBJECT: SWPP – Reimbursement from Reserve Fund for Replacement and Extraordinary Maintenance
DATE: November 2, 2021

The Southwest Water Authority (SWA) collects and maintains a reserve fund for "Replacement and Extraordinary Maintenance" (REM). This fund is required by authorizing legislation, and the agreement that transferred the operations and maintenance of Southwest Pipeline Project (SWPP) from the State Water Commission (Commission) to the SWA states that the expenditures from this fund are to be authorized by the Commission. The agreement also states that reserve fund shall be accumulated with interest and maintained in an amount to be determined by the Commission.

REM projects are generally included in the SWA's annual budget which is approved by the SWC at its December meeting. When need for REM projects arise after the SWC's approval of the budget, SWA consults with staff at the Department of Water Resources (DWR) as to whether or not a project qualifies for use of REM funds. SWA initially funds the construction of REM projects from their Operation and Maintenance fund and then seeks SWA Board and SWC approval of the reimbursement from the REM funds after the project is completed.

The Commission received the attached letter from the SWA requesting reimbursement from the REM funds for two separate projects totalling $1,286,852.17.

The projects for which reimbursement is being requested include replacement of 1,600 feet of 16" ductile iron pipe (DIP) south of Dickinson on Contract 2-3E for $754,450.14 and the other is for leak repair and corrosion assessement using the Pipe Diver Ultra Tool on the 30" DIP (Contract 2-3A) east of Taylor for $532,402.03.

Corrossion assessment of the Contract 2-3A pipeline is still continuing and the current estimated cost for replacement of 3,400 feet is $3.5 million. A condition assessment plan for all DIP on the SWPP is currently being developed.

SWA had requested using construction dollars for the replacement of the Contract 2-3A 30" DIP near Taylor, however at the December 2020 SWC meeting the SWC approved using REM funds for the replacement of the 2-3A pipeline and for the assessment of all metallic pipelines on the SWPP.

The attached map shows all the metallic lines on the SWPP and the location of the projects included in the reimbursement request.

Sustainability of REM funds, with the age of the infrastructure and major capital projects funded from the REM fund, is a concern. DWR staff, in consultation with the SWA, will develop a guidance on projects that would be considered REM. That guidance will be brought before the Commission for discussion and approval.

SSP:/1736-99

MEMORANDUM

To: Andrea Travnicek, Ph.D., Director, DWR

From: Ledeanna O'Shields, CFO/Office Administrator

Subject: **Reimbursement from the Reserve Fund for Replacement and Extraordinary Maintenance**

Date: October 5, 2021

Copy: Sindhuja S. Pillai-Grinolds, P.E., Project Manager, SWC
Mary Massad, Manager/CEO, SWA

Reimbursement from the Replacement and Extraordinary Maintenance Fund is being requested for two items of work.

Work has now been completed on Contract 2-3E Decker Subdivision ductile iron pipeline (DIP) replacement. The total expense was $754,450.14 and has been paid. A spreadsheet listing the invoices is included with this memorandum. Copies of the invoices are available upon request. This is a budgeted item for the Replacement and Extraordinary Maintenance (REM) Fund for 2021. The amount up to one million dollars was approved by the Board on April 6, 2020.

Work has now been completed on the May 14, 2020, Contract 2-3A MTL leak repair and DIP initial corrosion assessment using the PipeDiver Ultra Tool. The total expense was $532,402.03 and has been paid. A spreadsheet listing the invoices is included with this memorandum. Copies of the invoices are available upon request. The amount up to five hundred thousand dollars was approved by the Board on April 5, 2021.

The balance in the Reserve Fund for Replacement and Extraordinary Maintenance is $24,383,826.40 as of September 23, 2021.

I respectfully request the SWC approve the Contract 2-3E MTL Decker Subdivision DIP replacement and the May 14, 2020, Contract 2-3A MTL leak repair and DIP assessment near Taylor, including the PipeDiver Ultra Tool be eligible for reimbursement from the Reserve Fund for Replacement and Extraordinary Maintenance and approve the release of $1,286,852.17 from this fund at this time.

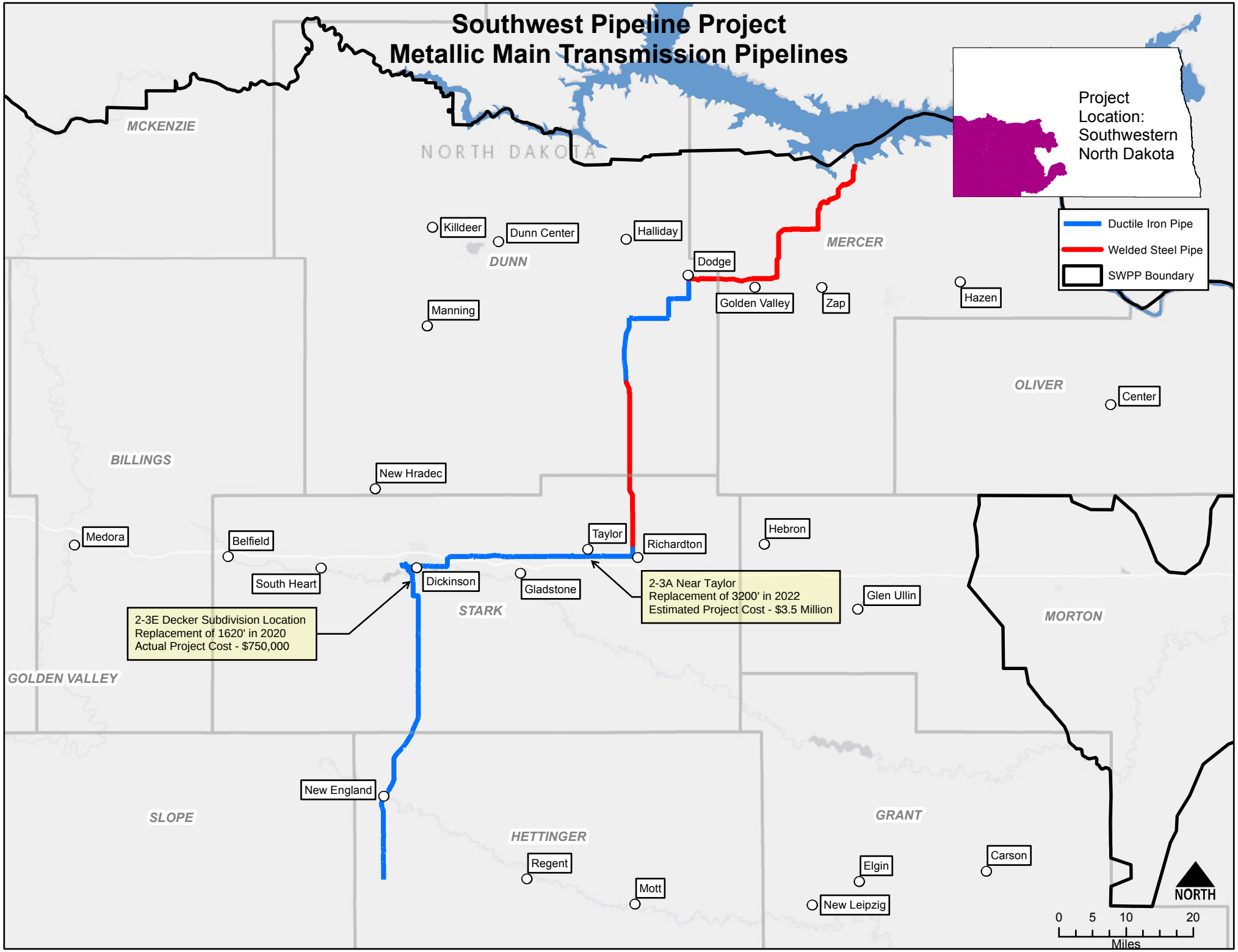
The SWA Board of Directors took similar action at its October 4, 2021, meeting.

2-3A MTL

May 2020 through Mar 2021		Various Vendors		$ 497,298.39
Sep 2020 through Sep 2021		Various Employees		$ 33,374.28
May 2020 through Mar 2021		Mileage		$ 1,729.36
TOTAL REM REIMBURSEMENT REQUEST				**$ 532,402.03**

2-3E DECKER SUBDIVISON

Jan 2020 through May 2021		Various Vendors		$ 730,735.30
Dec 2019 through Nov 2020		Various Employees		$ 22,853.72
Dec 2019 through Nov 2020		Mileage		$ 861.12
TOTAL REM REIMBURSEMENT REQUEST				**$ 754,450.14**


Southwest Pipeline Project
Metallic Main Transmission Pipelines
Project Location: Southwestern North Dakota
Ductile Iron Pipe
Welded Steel Pipe
SWPP Boundary
MCKENZIE
NORTH DAKOTA
Killdeer
Dunn Center
Halliday
DUNN
MERCER
Dodge
Golden Valley
Zap
Hazen
Manning
OLIVER
Center
BILLINGS
New Hradec
Medora
Belfield
Taylor
Richardton
Hebron
South Heart
Dickinson
Gladstone
STARK
Glen Ullin
MORTON
2-3E Decker Subdivision Location
Replacement of 1620' in 2020
Actual Project Cost - $750,000
2-3A Near Taylor
Replacement of 3200' in 2022
Estimated Project Cost - $3.5 Million
GOLDEN VALLEY
New England
SLOPE
HETTINGER
Regent
Mott
GRANT
Elgin
Carson
New Leipzig
NORTH
0 5 10 20
Miles

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MEMORANDUM

TO: Subcommittee members
FROM: Sindhuja S.Pillai-Grinolds, SWPP Project Manager
SUBJECT: SWPP – 2022 Water Rates
DATE: November 2, 2021

Under the agreement for the Transfer of Management, Operations, and Maintenance Responsibilities for the Southwest Pipeline Project (SWPP), (Transfer Agreement) the Southwest Water Authority (SWA) must prepare a budget by December 15 of each year and submit it to the Secretary of the State Water Commission (Commission). This budget is deemed approved unless the SWA is notified of the Commission's disapproval by February 15.

Water rates are a primary component of the SWA's budgeting process. The Commission approves the Capital Repayment rate and the reserve fund for Replacement and Extraordinary Maintenance (REM) rate explicitly by SWC action.

Capital Repayment:

Capital Repayment portion of the water rate collected is currently returned back to the Resources Trust Fund. An amendment to the Transfer Agreement that transferred the operations and maintenance of the SWPP to the SWA, established the Consumer Price Index (CPI) in effect on September 1 (August CPI) as the basis for determining the Capital Repayment rate. The September 1, 2021, CPI adjustment results in a 5.27 percent increase in the Capital Repayment rate for 2022. Based on that adjustment, the Capital Repayment rate for contract customers increases from $1.25/1,000 gallons to $1.32/1,000 gallons, rural customer's Capital Repayment rate increases from $38.11/month to $40.12/month, and the Capital Repayment rate for SWPP customers that tie into the Missouri West Water Sytem increases from $30.19/month to $31.78/month. The SWA Board of Directors approved the 2022 water rates along with the above Capital Repayment rates on November 1.

REM Rate:

The REM rate adjustment and guidance for using REM funds is not spelled out clearly in the Transfer Agreement. The Transfer Agreement states that the REM reserve fund shall be accumulated with interest and maintained in an amount to be determined by the Commission and also the Commission shall determine whether or not a proposed project is replacement or extraordinary maintenance. In the Transfer Agreement, the base rate for REM was set at

$0.30/1,000 gallons for contract customers and $.10/1,000 gallons for rural customers. The REM rate for distribution customers has remained at $.10/1,000 gallons to date since the Transfer Agreement was signed on December 21, 1995. However, rural customer's water rate includes the contract REM rate in addition to the distribution REM rate. REM rate for contract customers was increased to $0.35/1,000 gallons in 1999. The contract REM rate was increased to $0.40/1,000 gallons in 2013, $0.50/1,000 in 2014, $0.55/1,000 in 2015, $0.65/1,000 in 2016 and $0.70/1,000 gallons in 2018. Contract REM rate has remained at $0.70/1,000 since 2018. At the SWA Board meeting on November 1, 2021, water rate with no REM rate increase was approved for 2022. The attached graph shows the contract REM rate history. Department of Water Resources staff, in consultation with the SWA, will develop a guidance on projects that would be considered REM. That guidance will be brought to the Commisison for discussion and approval. DWR staff, in consultation with the SWA, will also determine the REM rate adjustments necessary to meet the REM guidance. The adjustments, if necessary, will be recommended for 2023 water rates and beyond.

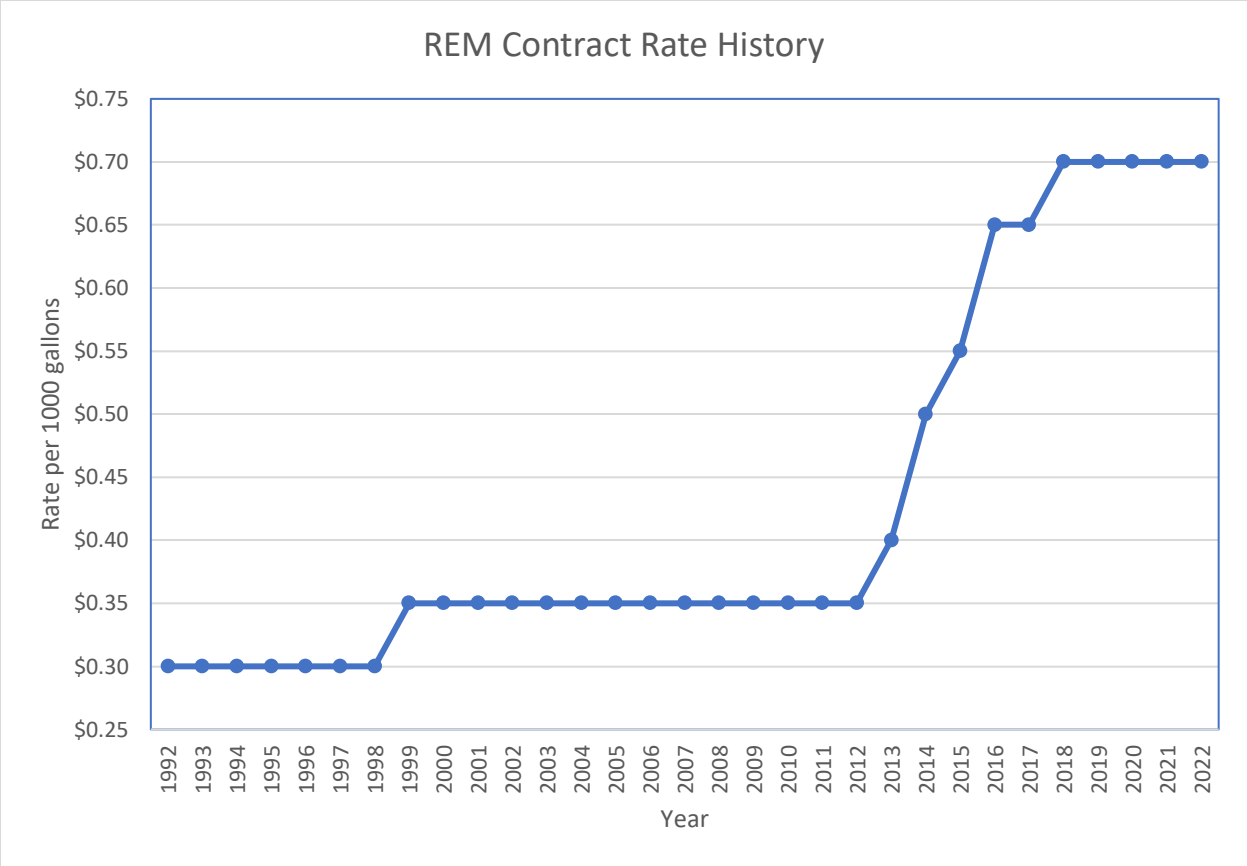

Figure 1: SWPP REM Contract Rate History

The 2022 budgeted income into the reserve fund for REM is $2.08 million which includes $0.37 million in interest income. The budgeted expense from the fund for 2022 is $6.13 million. The major REM projects for 2022 includes $1.27 million for automatic meter read replacements, $3.8 million for ductile iron pipe replacement and assessment, and $0.50 million for recoating of the Davis Buttes Tank. The budgeted 2022 year end balance in the REM fund is $19.65 million. Through September 2021, $407.05 million was spent on the SWPP.

Tables below show the summary of the Capital Repayment and REM rates.

Capital Repayment Rates

Customer	2021 Rate	2022 Rate	Change
Contract Customer	$ 1.25	$ 1.32	$ 0.07
SWA Rural Customer	$ 38.11	$ 40.12	$ 2.01
Morton County Customer	$ 30.19	$ 31.78	$ 1.59
Oil Industry Rate - SWA Depot	$ 3.00	$ 3.00	$ -
Oil Industry Rate - Others	$ 4.00	$ 4.00	$ -

REM Rates

Customer	2021 Rate	2022 Rate	Change
Contract Customer	$ 0.70	$ 0.70	$ -
SWA Rural Customer	$ 0.80	$ 0.80	$ -
Morton County Customer	$ 0.80	$ 0.80	$ -
Oil Industry Rate - SWA Depot	$ 3.00	$ 3.00	$ -
Oil Industry Rate - Others	$ 4.00	$ 4.00	$ -

SSP:/1736-99

D1and D2

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TO: State Water Commission subcommittee members
FROM: Andrea Travnicek, Ph.D., Secretary
SUBJECT: November 10, 2021, SWC Subcommittee Meeting-NAWS Items
DATE: November 4, 2021

South Prairie Reservoir and Hydraulic Control Structure:

NAWS Contract 5-1A will be for the construction of a 10-million-gallon reservoir and flow control facility near the South Prairie school and a hydraulic control structure on the high point of the pipeline alignment. Bids were originally scheduled to be opened November 9, 2021, but the bid opening was pushed back to November 17, 2021, at the request of the reservoir contractors to allow more time to refine their bids. We plan to have this contract on the agenda for the December State Water Commission meeting for award. The opinion of probable construction cost is below:

Contract 1 – General Construction: $4.2 million
Contract 2 – Mechanical Construction: $2.4 million
Contract 3 – Electrical Construction: $550,000
Contract 4 – Reservoir Construction: $7.4 million
Contract 5 – Combined contract 1, 2, 3, and 4: $14.6 million
Contract 6 – Combined contracts 1, 2, and 3: $7.2 million

Interim Water Supply Agreement:

The NAWS project has been serving users since 2008 under the attached interim water supply agreement with the City of Minot. The agreement will need to be amended if the project is going to be able to serve additional customers. Water from Minot's groundwater sources is purchased by NAWS as treated water and served to Burlington/West River, Berthold, Upper Souris Water District, Kenmare, Mohall, Sherwood, and All Seasons Water Users District under this agreement.

The interim water supply agreement was executed in 2008 based on average day demands for the NAWS contract customers and Minot's ability to produce additional water beyond their own demand, which is currently based on their water treatment capacity (~13 MGD). Completion of the Phase II Improvement to the Minot WTP will bring the treatment capacity to 18 MGD, but the capacity of the well fields is approximately 15-16 MGD. The Phase II Improvements to the Minot WTP are nearing completion and our pipeline will be able to deliver water to Bottineau later this month or early next month.

We are currently working with our consultant engineer, water users, and the City of Minot on an amendment to increase the water available to the project to serve NAWS customers. Factors being considered include water needs for Bottineau, Westhope, All Seasons Water Users District, Upper Souris Water District as well as treatment capacity, raw groundwater availability, and hydraulic distribution capacity. The Burlington/West River connection could benefit from additional capacity as well. Completion of the Lansford Reservoir and Pump Station next year will greatly improve the distribution capacity and enable additional service connections to Upper Souris and All Seasons so the amendment may likely need to encompass all water needs through the interim period until Lake Sakakawea water is delivered to Minot or until project completion.

We are attempting to have an amendment available for the Commission's consideration at the December meeting, but it may not be ready until the February or April meeting as there are multiple parties and many variables involved.

WATER SERVICE CONTRACT
For NAWS Purchase of Interim Supply from Minot

The parties to this contract are the State of North Dakota, acting through the North Dakota State Water Commission (Commission) and the City of Minot (City).

1. PURPOSE OF CONTRACT.

North Dakota Century Code (N.D.C.C.) Chapter 61-24.6 authorizes Commission to develop a project to deliver water throughout northwest North Dakota for multiple purposes, including domestic, rural water districts, and municipal uses. This water project is known as the Northwest Area Water Supply Project (Project). Commission, pursuant to N.D.C.C. Chapter 61-02 and Chapter 61-24.6, may enter into contracts to aid and promote Project. Commission sells water to City under a separate water service contract. The intent of this contract is to enable Commission to purchase treated water from City for an interim period until Commission receives water delivered from Lake Sakakewea, at which time Commission will no longer purchase treated water from City.

2. TERM OF CONTRACT.

This contract shall remain in effect for ten (10) years after the date of execution by Commission unless terminated earlier according to the terms of this contract.

3. TERMINATION.

Commission may terminate this contract when Commission, at its sole discretion, determines that it can receive water delivered from Lake Sakakawea. This contract may be terminated at any time by mutual consent of both parties, in writing.

4. QUALITY OF WATER.

All water delivered to Commission pursuant to this contract, or any renewal, extension, or modification thereof, shall be potable treated water that meets applicable water quality standards of the Safe Drinking Water Act, as amended. City is not responsible for water quality beyond the point of delivery.

5. POINTS OF DELIVERY.

City will furnish water to Commission at the Berthold turnout and at any future metering points identified during the annual water rate adjustment.

6. CURTAILMENT OF DELIVERY FOR MAINTENANCE PURPOSES.

City may temporarily discontinue or reduce the amount of water to be furnished to Commission to maintain, repair, replace, investigate, or inspect any of the facilities and works necessary to furnish water to Commission. To the extent possible, City will give

Commission reasonable notice in advance of any such temporary discontinuance or reduction. No advance notice will be required to be given in the case of an emergency.

7. NO LIABILITY FOR SHORTAGES.

In no event shall any liability accrue against City or any of its officers, agents, or employees for any damage or inconvenience, direct or indirect, arising from any water shortages or other interruptions in water deliveries resulting from any cause. The contractual obligation of Commission under this contract shall be suspended during any such shortage or interruption only if (a) the shortage or interruption is unique to Commission (as opposed to other water uses), (b) the shortage or interruption is so severe and prolonged as to defeat Commission's legitimate contractual expectations in entering into this contract, and (c) the shortage or interruption is due to an action of City.

8. PROPORTIONAL SHARING OF WATER SHORTAGE.

City shall have the right during times of water shortage from any cause to allocate and distribute the available water supply to persons and entities that have executed a water service contract with City (hereafter City Water User) on a proportionate basis. However, City reserves the right to deviate from this rule of proportionality if necessary to supply the minimum health and safety requirements of any City Water User.

9. METERING OF WATER DELIVERY.

Commission shall furnish, install, operate, and maintain, at its own expense, at the point of delivery, the necessary metering equipment, including a meter house or pit, and required devises of standard type for properly measuring the quantity of water delivered to Commission.

10. ACCESS TO METER.

Commission and City shall have access to the metering equipment belonging to the other at all reasonable times. Access includes all reasonable means of access, including any necessary easement. City shall have access to the point of delivery to Project. Commission shall have access to the point of delivery to City's distribution system.

11. DISPUTE OVER MEASUREMENT OF WATER.

If City believes the measurement of water delivered to Commission to be in error City will cause the meter to be calibrated. Commission shall pay for the cost of the calibration if the meter is found to over-register or under-register by more than two percent (2%) of the correct volume. If the meter is found to be within 2% of the correct volume, City will pay for the cost of calibration.

12. CLAIM OF ERROR.

Commission's claim of error presented after a payment has become delinquent shall not prevent discontinuance of service or civil action as provided in this contract. Commission agrees to continue to make payments for water service after a claim of error has been presented; however, it may do so under protest, and such payments will not prejudice Commission's claim of error.

13. CORRECTION OF METER READINGS.

If the calibration of any meter establishes that the previous readings of such meter under or over-registered by more than two percent (2%) the correct volume of water delivered to Commission, the meter readings for that meter shall be corrected to the beginning of the current year. The amount of any underpayment by Commission, because the meter under-registered the amount of water delivered to Commission for the period of time for which the correction is applied, shall be paid to City within sixty (60) days of receipt of a notice from City. The amount of any overpayment by Commission, because the meter over-registered the amount of water used by City for the period of time for which the correction is applied, shall be refunded to Commission or credited upon future payments under this contract.

14. FAILURE OF METER.

If any meter fails to register for any period, the amount of water delivered during such period shall be deemed to be the amount of water delivered in the corresponding period immediately prior to the failure, unless City and Commission shall agree upon a different amount.

15. RESPONSIBILITY FOR DISTRIBUTION AND USE OF WATER.

Commission shall be responsible for the control, distribution, and use of all water delivered to Commission by City under this contract beyond the points of delivery. Commission is responsible for all services, maintenance, and repair of the distribution system.

16. WATER RATE.

City's rate for water purchased under this contract shall be calculated solely to reimburse City its cost to treat and supply the water. Each September, Commission and City will agree to a rate that will be effective on January 1st of the following year. For 2008, the parties agree that City's rate for water purchased by Commission is $1.57 for every 1,000 gallons purchased. The estimated average and peak usage is provided as Exhibit 1 to this contract, The estimated usage will be reviewed and revised with the water rate adjustments.

17. BILLING PROCEDURE AND POINT OF METERING.

Commission, or Commission's agents, will read the metering equipment at the NAWS bulk distribution connections and report to City. The metering point for billing in 2008 is the Berthold master meter. The metering point for billing is provided in Exhibit 1 to this contract. Exhibit 1 will be updated annually with the water rate adjustments. City will bill Commission.

18. WHEN PAYMENTS ARE DUE.

All payments shall be made no later than 15 days following receipt of the statement from City. Payments not made by such date shall be considered delinquent and in default.

19. THIRD-PARTY CLAIMS.

Each party agrees to assume its own liability for any and all claims of any nature from third parties, including all costs, expenses, and attorney's fees which may in any manner result from or arise out of this agreement. However, there are no third party beneficiaries of this contract, intended or otherwise. This contract is not intended to benefit any persons other than the parties hereto, and is not entered into with the intent to benefit any other person, directly or indirectly.

20. ACCESS TO AND INSPECTION OF BOOKS AND RECORDS.

Each party shall have the right, during normal business hours, to inspect and make copies of the other party's books and official records relating to matters covered by this contract.

21. REMEDIES NOT EXCLUSIVE.

The use by either party of any remedy specified herein for the enforcement of this contract is not exclusive and shall not deprive the party using such remedy of, or limit the application of, any other remedy provided by law.

22. AMENDMENTS.

This contract may be amended at any time by mutual agreement of the parties, except insofar as any proposed amendments are in any way contrary to applicable law, but such amendments will not be binding or effective unless made in writing and executed by the parties.

23. WAIVER OF RIGHTS.

Any waiver at any time by either party of its rights with respect to a default or any other matter arising in connection with this contract, shall not be deemed to be a waiver with respect to any other default or matter.

24. NOTICES.

All notices that are required either expressly or by implication to be given by any party to any other under this contract shall be in writing. All such notices shall be deemed to have been given and delivered, if delivered personally or if delivered by registered or certified mail. All notices shall be addressed to a party at its address shown on the signature page of this contract, unless it shall have provided notice (in the manner called for in this Subsection) to the other parties of a change of address.

25. MERGER.

This contract constitutes the entire contract between the parties. No waiver, consent, modification, or change of terms of this agreement shall bind either party unless in writing, signed by the parties, and attached herein. Such waiver, consent, modification, or change, if made, shall be effective only in a specific instance and for the specific purpose given. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this contract.

IN WITNESS WHEREOF, the parties execute this contract on the date specified below.

NORTH DAKOTA STATE WATER COMMISSION
900 East Boulevard Avenue
Bismarck, ND 58505

By: Dale L Frink

Title: Secretary

Date: August 15, 2008

Approved and entered into by resolution of the State Water Commission this 29th day of July, 2008.

Dale L Frink
Secretary and State Engineer

CITY OF MINOT

* By: [signature]

Title: Mayor

Date: 8/18/2008

* Amendment to Termination (Article 3) to follow

Exhibit 1 to Water Service Contract for NAWS Purchase of Interim Supply from Minot

Estimated Average and Peak Usage for 2008-0210 for 2008 water rate development
Date: 7/7/2008

Average Day Demand (gpd)

Year	Berthold	USWUD	Kenmare	Mohall	Sherwood	ASWU III	Carpio	Burlington & West River	Estimated water supply from Minot
2008*	34,000								**34,000**
2009	34,300								34,300
2010	34,600	127,000	116,000	92,000	20,000	106,000	18,000	179,000	692,600
2011	34,900	127,000	116,000	92,000	20,000	106,000	18,000	179,000	692,900
2012	35,200	127,000	116,000	92,000	20,000	106,000	18,000	179,000	693,200

* anticipated water service beginning in August 2008

Peak Day Demand

Year	Berthold	USWUD	Kenmare	Mohall	Sherwood	ASWU III	Carpio	Burlington & West River	Estimated water supply from Minot
2008*	85,000								**85,000**
2009	85,900								85,900
2010	86,800	127,000	116,000	92,000	20,000	106,000	45,000	179,000	771,800
2011	87,700	127,000	116,000	92,000	20,000	106,000	45,000	179,000	772,700
2012	88,600	127,000	116,000	92,000	20,000	106,000	45,000	179,000	773,600

Methodology:
- Used average of 2001-2007 reported withdrawals from water permits, unless spike in reported use was higher for more recent reporting period
- Minot North Hill connection is assumed operational by 2010
- Berthold average day demand was based on reported withdrawal and includes peaking factor of 2.5 plus 1 percent annual adjustment (SA 40 report)
- USWUD, Kenmare, Mohall, Sherwood, ASWU III, and Burlington were not assigned a peaking factor due to water constraints during interim period
- Carpio was estimated by design criteria of 31 gpm peak day demand w/ average day demand determined by dividing by assumed peaking factor of 2.5
- NPWD connected demand was estimated based on 32 connections at 2.5 people per connection, 110 gpcd, 2.5 peaking factor
- NPWD users estimated for connected demand were 72 additional connections in both 2010 and 2012
- NPWD connections remain Minot connection points through interim period
- NAWS Interim BPS will provide City of Minot South Hill connection with peak flow assuming the South Hill pump station is online at the end of 2008
- NAWS master meter for Berthold Segment will be flow controlled to approx. 550 gpm until HSPS commissioning
- Full Minot peak day demand for South and North Hill connections will be provided in 2010 following HSPS commissioning

Metering Points for Billing
Date: 7/7/2008

1. Berthold Master Meter

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696 • INTERNET: http://swc.nd.gov

January 23, 2009

Mayor Curt Zimbelman
City of Minot
515 2nd Ave SW
Minot, ND 58701

Subject: Amendment to NAWS Purchase of Interim Supply from Minot, Water Service Contract

Dear Mayor Zimbelman:

Enclosed is the Water Service Contract Amendment discussed during the NAWS Celebration in Berthold. The Amendment recognizes water supply from Minot is only an interim solution and if water supply from Lake Sakakawea does not continue to progress, then Minot needs to be able to terminate the Contact and reserve the limited water supply for water users within Minot.

Please sign the Amendment, retain one for your records and return the other back to the State Water Commission. If you have any questions please contact me at 701-328-4959.

Sincerely,

Michelle Klose

Michelle Klose, P.E.
NAWS Project Manager

cc: Alan Walter, Public Works Director

Enclosures
MK:mmb/237-4

JOHN HOEVEN, GOVERNOR
CHAIRMAN

DALE L. FRINK
SECRETARY AND STATE ENGINEER

City of Minot

Office of the Mayor

January 27, 2009

Michelle Klose, P.E.
NAWS Project Manager
ND State Water Commission
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

RE: Amendment to NAWS Purchase of Interim Supply from Minot, Water Service Contract

Dear Michelle,

Enclosed is the signed Water Service Contract Amendment recognizing that water supply from Minot is only an interim solution and that if water supply from Lake Sakakawea does not continue to progress, then Minot would need to be able to terminate the Contract and reserve the limited water supply for water users within Minot. We have retained one copy for our records as per your instructions.

Sincerely,

Toni Smith

Toni Smith
Executive Secretary
City of Minot

Encl.

515 2nd Ave. SW • Minot, North Dakota 58701-3739 • (701) 857-4750 • Fax (701) 857-4751
mayor@web.ci.minot.nd.us

Water Service Contract For NAWS Purchase of Interim Supply from Minot Amendment 1

The State of North Dakota, acting through the North Dakota State Water Commission and the City of Minot hereby agree to amend the Interim Water Service Contract between them. Specifically, the paragraph titled "Termination" shall be amended to read as follows:

"Commission may terminate this contract, with a 90 day notice to the City, when the Commission, at its sole discretion, determines it can receive water delivered from Lake Sakakawea. Minot may terminate this contract, with a 1-year notice to the Commission, when Minot, at its sole discretion, determines that delivery from Lake Sakakawea is not progressing and the continued supply to NAWS is to the detriment of the City of Minot water users. This contract may be terminated at any time by mutual consent by both parties in writing."

IN WITNESS WHEREOF, the parties execute this amendment on the date specified below.

NORTH DAKOTA STATE WATER COMMISSION
900 East Boulevard Avenue
Bismarck, ND 58505

By: DALE L FRINK

Title: Secretary

Date: 1-23-2009

Approved and entered into by resolution of the State Water Commission this 30TH, day of September, 2008.

Secretary and State Engineer

CITY OF MINOT

By:

Title: Mayor - City of Minot

Date: 1-26-09

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Dale L Frink
Secretary and State Engineer

CITY OF MINOT

By: _____

Title: _____

Date: _____

NORTH Dakota | Water Resources
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TO: Members of the Water Commission
FROM: Andrea Travnicek, Ph.D., Secretary
SUBJECT: SWC Cost-Share Policy Modifications
DATE: November 2, 2021

Staff have identified multiple Cost-Share Program policy issues over the course of the last several months that have been discussed by Commissioners or staff for future consideration. Some of those issues are more complex, and will require additional discussion, planning, and constituent input over several months. However, a couple of those issues are much more straight forward, and have been implemented in practice more recently, but are not specified in written policy. Two of those issues are related to the following:

- ***CLOMR (Conditional Letter of Map Revision) Acquisition***
  In the past, flood control projects have been delayed while waiting for acquisition of a CLOMR from FEMA. The significance of a CLOMR is it indicates whether the project, if built as proposed by the sponsor, would ultimately be recognized by FEMA as compliant with National Flood Insurance Program (NFIP) minimum standards. If construction proceeds before a CLOMR is issued, it is possible that FEMA's detailed technical review may find the project to be in violation of the NFIP, which could require costly modifications to correct. Being in violation of the NFIP also jeopardizes a community's ability to participate in the NFIP, which would make federally subsidized flood insurance and associated grant programs unavailable to all members of the community. This in turn can result in project delays, failure to meet project goals, stranded cost-share assets, and increased carryover totals. To mitigate this risk, the Commission has more recently asked sponsors to acquire a CLOMR during pre-construction efforts - before cost-share for construction is considered. This practice is not currently written in existing policy.

- ***Loan Requests and Evaluations***
  HB 1431 established the Water Infrastructure Revolving Loan Fund (WIRLF) and provided supplemental funding and opportunities for the Infrastructure Revolving Loan Fund (IRLF). This will result in additional loan funds available for multiple infrastructure project types. By practice, the Commission is requiring project sponsors to provide confirmation from the Bank of North Dakota – confirming sponsors' ability to repay loans for which they're seeking approval from the Commission. This practice is not currently written in existing policy.

In consideration of the aforementioned cost-share modifications being implemented currently, it seems appropriate that they be formally supported by a more timely policy modification – possibly in December. For the remaining policy issues that will require additional discussion, planning, and constituent input, I would suggest the Commission's subcommittees meet specifically to address various policy issues in the coming months.

F1

NORTH Dakota | Water Resources
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WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
City of Neche Levee Certification Project	City of Neche, North Dakota

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
SS	*Cost-Share Application Form (SFN 60439)
SS	*Project Specific Map (Including an inset map of location within state.) See Examples
SS	*Detailed Project Costs SFN 61801 (complete fillable worksheet)
X	Approved Drainage Permit (Rural Flood Control Only)
X	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
X	Sediment Analysis (Drain Reconstruction Only)
X	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
X	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
X	Plans & Specifications For Bidding Project Construction (Construction Requests Only)
X	Economic Analysis Worksheet (Flood Control & Water Conveyance Construction Only)
X	Life Cycle Cost Analysis Worksheet (Water Supply Construction Only)
X	Capital Improvement Plan SFN 61938 (Water Supply Construction Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Stuart Symington	Stuart Symington	8/16/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

SWC Date Received : 8/18/21

City of Neche, ND

Stuart Symington, Mayor
353 Madison Ave, Neche, ND 58265
701-238-3502
Stu.sym@gmail.com

August 16, 2021

Mr. John Paczkowski, P.E., Interim State Engineer, Chief Engineer-Secretary
North Dakota Department of Water Resources
ATTN: Cost-Share Program
900 East Boulevard Avenue, Dept 770
Bismarck, ND 58505-0850

RE: Request For Additional Cost Share Assistance, City of Neche Levee Certification Project

Mr. Paczkowski:

Attached you will find an application for cost-share assistance for the Final Design of this Project.

The City of Neche has been working with the State Water Commission for over six years. This time has been spent completing the feasibility study and detailed hydraulic modeling necessary to advance the Project towards completion. As we enter the next phase of work that includes the final designs and associated project development activities, we hope to that the Department of Water Resources will continue to support us with a new cost-share agreement.

The City is requesting the Department of Water Resources to contribute 60% of the total costs, which are detailed in the attached SFN 61801 delineation of costs worksheet. Also attached to this letter is a Project location map and the current contract with our engineering consultants at HDR. A portion of this request includes hydraulic modeling costs that have already been paid during the previous phase, but were above the maximum from the previous cost-share agreement. The geotechnical investigations and the CCTV culvert inspections are placeholders until those contracts can be completed with to-be-determined consultants.

We appreciate your participation with our Project as we move towards levee certification and removal of our City from the 100 year floodplain.

Sincerely,

Stuart Symington
Mayor of Neche

Encl: SFN 60439 Cost Share Application
SFN 61801 Delineation of Costs
Project Location Map
Final Design Scope and Budget

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (7/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
City of Neche Levee Certification Project

Sponsor(s)
City of Neche, North Dakota

County	City	Township/Range/Section
Pembina	Neche	T164N, R53W, SECT 31

Request Type ☐ New ☒ Updated (previously submitted)

Description Type ☒ Pre-Construction ☐ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☒ Floodplain Mgmt. ☒ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☐ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☒ FEMA Levee Program	☐ Municipal Water Supply	☐ Rural Flood Control	
☒ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
City of Neche, Pembina County

Description Of Problem Or Need And How The Project Provides A Solution
The City of Neche does not have a Base Flood Elevation, and is mapped in the FEMA 100-year flood hazard area. Also, the levee protection system surrounding the City needs to be upgraded to meet the FEMA standards for levee certification. With the Department of Water Resources assistance, the City recently completed a BFE study of the Pembina River and received comments from FEMA. However, the City cannot officially establish the BFE without completing final design of the levee protection system. After final design is complete, the City can re-submit the BFE study and proposed levee protection system upgrades to FEMA in order to obtain a conditional Letter of Map Revision.

Level Of Study Completed
Levee deficiency report (Completed in 2014)
BFE Study, submitted as part of a CLOMR request to FEMA in November 2020. Includes the detailed hydrologic and hydraulic analysis of the Pembina River at Neche, as well as concepts for a levee protection system Project which will meet requirements for levee certification.

Describe Potential Obstacles To Implementation

Land Acquisition

Right-of-way for existing levee footprint may not be recorded, and may need to be done prior to construction.

Permits

Early coordination will be done to ease the process

Funding

The City is actively searching for funding

Local Opposition

None

Environmental Concerns

None

Other

None

Funding Timeline (carefully consider when DWR cost-share will be needed)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$3,291,750.00	$503,000.00	$ 2,788,750.00	$
Other State	$0.00	$	$	$
Local	$2,194,500.00	$335,273.00	$ 1,859,227.00	$
Total	$5,486,250.00	$838,273.00	$ 4,647,977.00	$ 0.00

Funding Detail (provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
	$			%
	$			%
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status

Final Design will be completed in early 2023, and construction in middle or late 2023

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)
Completed 11/2020	January 2023	March 2023

Construction Start (Month/Year)	Construction Completion (Month/Year)
July 2023	July 2025

Has Economic Analysis Been Completed?	☐ Yes	☒ No	☐ Ongoing	☐ Not Applicable
Has Life Cycle Cost Analysis Been Completed?	☐ Yes	☒ No	☐ Ongoing	☐ Not Applicable
Has Feasibility Study Been Completed?	☒ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable

Have Assessment Districts Been Formed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable — If Yes, (Date)?

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☒ No

Have You Applied For Any Federal Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☒ No	☐ Not Applicable
Type		Number	
If Yes, Please Explain			
Have You Applied For Any State Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☒ No	☐ Not Applicable
Type		Number	
If Yes, Please Explain			
Have You Applied For Any Local Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☒ No	☐ Not Applicable
Type		Number	
If Yes, Please Explain			

Submitted By Stuart Symington			Date 8/16/2021
Address 353 Madison Ave	City Neche	State North Dakota	ZIP Code 58265
Sponsor's Telephone Number 701-238-3502		Sponsor's Email Address stu.sym@gmail.com	
Engineer's Name Nate Dalager		Engineer's Telephone Number 218-681-6100	
Engineer's Company HDR		Engineer's Email Address nate.dalager@hdrinc.com	
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.			
Signature Stuart Symington			Date 8/16/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email

N

0 500 1,000
FEET

LEGEND

- Roadway Entrances
- Proposed Levee Alignment
- Pump Stations
- Gravity Culvert
- Underground Telephone
- Local Roads
- State Roads
- County Line

CITY OF NECHE

LEVEE CERTIFICATION PROJECT
PROPOSED PROJECT AREA

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CS APPLICATION

PATH: Y:\PROJECTS\NECHE, ND\MAP_DOCS\MXD\NECHE_STUDY_AREA_FINALDESIGN_ANSI_B_PORTRAIT.MXD - USER: JHUWE - DATE: 8/3/2021

DELINEATION OF COSTS
NORTH DAKOTA DEPARTMENT OF WATER RESROUCES
PLANNING AND EDUCATION
SFN 61801 (7/2021)

DWR received on 08-18-2021

Project:	City of Neche Levee Certification Project
Sponsor:	City of Neche
Contact:	Stuart Symington, Mayor
Phone:	701-238-3502
Engineer:	Nate Dalager, HDR
Phone:	218-681-6100

Total Cost :	$ 838,273
Ineligible Cost :	$ -
Eligible Cost :	$ 838,273
Local Cost :	$ 335,273

Date: August 16, 2021

Cost-Share $
$ 503,000

Project Type:	**Cost-share %**
FEMA Flood Levee Accreditation	60%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	#DIV/0!		0		-	$ -	60%	$ -
2	#DIV/0!		0		-	$ -	60%	$ -
3	#DIV/0!		0		-	$ -	60%	$ -
4	#DIV/0!		0		-	$ -	60%	$ -
5	#DIV/0!		0		-	$ -	60%	$ -
6	#DIV/0!		0		-	$ -	60%	$ -
7	#DIV/0!		0		-	$ -	60%	$ -
8	#DIV/0!		0		-	$ -	60%	$ -
9	#DIV/0!		0		-	$ -	60%	$ -
10	#DIV/0!		0		-	$ -	60%	$ -
11	#DIV/0!		0		-	$ -	60%	$ -
12	#DIV/0!		0		-	$ -	60%	$ -
13	#DIV/0!		0		-	$ -	60%	$ -
14	#DIV/0!		0		-	$ -	60%	$ -
15	#DIV/0!		0		-	$ -	60%	$ -
16	#DIV/0!		0		-	$ -	60%	$ -
17	#DIV/0!		0		-	$ -	60%	$ -
18	#DIV/0!		0		-	$ -	60%	$ -
19	#DIV/0!		0		-	$ -	60%	$ -
20	#DIV/0!		0		-	$ -	60%	$ -
21	#DIV/0!		0		-	$ -	60%	$ -
22	#DIV/0!		0		-	$ -	60%	$ -
23	#DIV/0!		0		-	$ -	60%	$ -
24	#DIV/0!		0		-	$ -	60%	$ -
25	#DIV/0!		0		-	$ -	60%	$ -
26	#DIV/0!		0		-	$ -	60%	$ -
		Construction Sub-Total				$ -	60%	$ -
	0.0%	**Contingency**				$ -	60%	$ -
	0.0%	**Construction Total**				$ -	60%	$ -
		Engineering Costs						
27	#DIV/0!	Hydraulic Models	1	NA	48,477.33	$ 48,477	60%	$ 29,086
28	#DIV/0!	Geotechnical Investigations	1	NA	35,000.00	$ 35,000	60%	$ 21,000
29	#DIV/0!	CCTV Culvert Inspections	1	NA	10,000.00	$ 10,000	60%	$ 6,000
30	#DIV/0!	Final Design	1	NA	744,796.00	$ 744,796	60%	$ 446,878
31	#DIV/0!		0		-	$ -	60%	$ -
32	#DIV/0!		0		-	$ -	60%	$ -
32	#DIV/0!		0		-	$ -	60%	$ -
33	#DIV/0!		0		-	$ -	60%	$ -
	100.0%	**Engineering Total**				$ 838,273	60%	$ 502,964
		Other Eligible Costs						
34	0.0%		1		-	$ -	60%	$ -
35	0.0%		1		-	$ -	60%	$ -
36	0.0%		1		-	$ -	60%	$ -
37	0.0%		1		-	$ -	60%	$ -
38	0.0%		1		-	$ -	60%	$ -
39	0.0%		1		-	$ -	60%	$ -
40	0.0%		1		-	$ -	60%	$ -
41	0.0%		1		-	$ -	60%	$ -
	0.0%	**Other Eligible Total**				$ -	60%	$ -
		In-eligible Costs						
42	0.0%		1		-	$ -	0%	$ -
43	0.0%		1		-	$ -	0%	$ -
44	0.0%		1		-	$ -	0%	$ -
45	0.0%		1		-	$ -	0%	$ -
46	0.0%		1		-	$ -	0%	$ -
47	0.0%		1		-	$ -	0%	$ -
48	0.0%		1		-	$ -	0%	$ -
49	0.0%		1		-	$ -	0%	$ -
					-			
	0.0%	**Other Ineligible Total**				$ -	0%	$ -
	100.0%				**Total**	$ 838,273		
					Eligible Total	$ 838,273	60%	$ 502,964

Federal or State Funds That Supplant Costs	$ -		
Eligible Cost Total	$ 838,273	60%	$ 502,964

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

Economic Analysis Review

Project Title: City of Neche Levee Certification Project Date: November 1, 2021

Description:

The Project will provide a certifiable flood protection system for the City from the 1-percent-annual-chance flood event.

Project Overview

Project Area:	The levee system surrounds the City of Neche
County	Pembina
City	Neche
Parcels Impacted	207
Urban	Yes
Population Served	338

Cost	Construction	O & M	Total
Nominal	$5,500,000	$1,000/yr	$5,551,000
PV (50 years)	$5,432,927	$26,140	$5,459,067
$ / Capita	$16,073.75	$77.34	$16,151.09
$ / Parcel	$26,246.02	$126.28	$26,372.30

Inputs

Protection Level: 1:100

Consumptive and Non-Consumptive Benefits:

NA

Detours:

NA

Results

Project Performance Metrics	Present Value	Average Annual	Notes
Benefit-to-Cost Ratio	0.714		
Net Benefits	-$1,562,594	-$55,094	
Payback Year	None		

Average Annual Damages

Rural	Difference	Without	With
Cropland	-	-	-
Pasture	0	0	0
$	-	-	-

Urban	Difference	Without	With
Damage to structures at risk	$127,394	$127,394	$0
Value of other flood costs	$19,969	$19,969	

Model Function

The economic model appears to have functioned properly. The results are deemed to be reliable and repeatable with the inputs provided by the project sponsor.

Explanation of Results

The appropriate way to address this proposal is to look at the current flood damages vs. the damages post project. Based on evaluation by DWR Investigations Section staff, the current levee provides physical protection at the 1/100 event level. Therefore, adding to the current structure for insurance purposes does not provide additional protection from physical damages and returns a B/C ratio of 0.00. The view of this project as if it did not exist would be equivalent to assuming the structure is physically compromised. In the event the structure did not exist a B/C value of 0.72 would be potentially applicable. In either case, the B/C ratio is less than 1.00 and therefore returns less than one dollar in value for each dollar expended for flood protection and would, by policy, not qualify for full cost-share participation.

The analyses reported in the tables above are for the "without the existing levee" scenario yielding the B/C ratio of 0.72, which is a worst-case scenario, where expected damages are maximized. We estimate there will be zero inundation for the other scenarios where the levee integrity is maintained (100-year event with existing levee in place and 100-year event with the proposed certification project).

The Investigation Section identified issues with the hydraulic model provided for DWR review. Those issues will be articulated in a follow-up memo to this Commission and supplied to the project sponsors. The depth values in this EA are considered best available, which are those values provided by the sponsor. Housing damages are based on current rebuilding and replacement costs.

Population and Trend

	Year		Annual Population Growth Rate	Average Annual Population Increase/Decrease
	2010	2020		
ND Census: Dept. of Commerce	371	338	-0.9%	-3

Other Comments

There are currently 22 individual flood protection policies in Neche and there have been 6 claims since 1978 totaling just under $7,000 in total claims paid.

Glossary

PV - Present Value of all future costs or benefits adjusted to the current dollar value using an interest rate factor.

1:100 - The probability of an event. Commonly referred to as a one in one hundred year event, it is more accurately, a one in one hundred chance of an event of a specific magnitude happening each individual year.

Nominal - Refers to the dollars spent or benefitted without adjusting for time value of money or inflation.

Damage to Structures at Risk - Is the segregation of flood costs related to physical damage to structures.

Value of Other Flood Costs - All other costs associated with an event (*e.g.* flood fighting operations, time delays, relocations, etc).

NORTH Dakota | Water Resources

Be Legendary.

DWR Date Received : 10/26/21

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
Cass County Drain No. 37 Improvement Project - Prelimin	Maple River Water Resource District

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
CHL	*Cost-Share Application Form (SFN 60439)
CHL	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
CHL	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
X	Approved Drainage Permit (Rural Flood Control Only)
X	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
X	Sediment Analysis (Drain Reconstruction Only)
X	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
X	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
X	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
X	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
X	Life Cycle Cost Analysis Worksheet (Water Supply Only)
X	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Carol Harbeke Lewis	Carol Harbeke Lewis Digitally signed by Carol Harbeke Lewis Date: 2021.10.26 10:58:19 -05'00'	10/26/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/26/21

CASS COUNTY GOVERNMENT

SENT VIA EMAIL

October 26, 2021

Maple River Water Resource District

Rodger Olson
Chairman
Leonard, North Dakota

Gerald Melvin
Manager
Buffalo, North Dakota

Chad Miller
Manager
Buffalo, North Dakota

Beth Nangare
Cost Share Program Administrator
North Dakota Department of Water Resources
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

Dear Beth:

RE: Cass County Drain No. 37 Improvement Project
Davenport Township, Cass County, North Dakota

The Maple River Water Resource District (the "District") would like to complete preliminary engineering design for an improvement project on the upstream 2.5 miles of Cass County Drain No. 37 (the "Project").

The preliminary design of the Project would include a comprehensive survey of the existing drain, determine a new gradeline with flattened side slopes for channel stability, evaluate existing crossings, and determine updated crossing sizes. Once completed, the District will evaluate the proposed Project and continue with final design and construction.

The Project will cover the portion of the existing drain which begins in the SE 1/4 of Section 16 in Davenport Township (Township 137N, Range 51W) and continues south through the E 1/2 of Sections 21 and 28 in Davenport Township.

Pursuant to current Department of Water Resources cost-share policy, the District respectfully requests 45% cost-share for the Project study. Enclosed with this letter is the Water Resources Cost-Share Application Checklist and Cost-Share Request Form with required documents.

If you have any questions, please feel free to contact us or our project engineer, Alexa Ducioame, Moore Engineering, Inc., at 701-282-4692.

Sincerely,

MAPLE RIVER WATER RESOURCE DISTRICT

Carol Harbeke Lewis
Secretary-Treasurer

Attachments

Carol Harbeke Lewis
Secretary-Treasurer

1201 Main Avenue West
West Fargo, ND 58078-1301

701-298-2381
FAX 701-298-2397
wrd@casscountynd.gov
www.casscountynd.gov

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
Cass County Drain No. 37 Improvement Project - Preliminary Engineering

Sponsor(s)
Maple River Water Resource District

County	City	Township/Range/Section
Cass	Davenport/Kindred	Sec 16, 21, and 28 Davenport Twp

Request Type ☒ New ☐ Updated (previously submitted)
Description Type ☒ Pre-Construction ☐ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☐ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☒ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
Maple River Water Resource District
Cass County
Local Landowners

Description Of Problem Or Need And How The Project Provides A Solution
The project will address drainage, slope stability, and undersized or outdated crossing issues in the upstream 2.5 miles of the existing Cass County Drain No. 37. The preliminary design of the project would include a comprehensive survey of the existing drain, determine a new gradeline with flattened side slopes for channel stability, and evaluate existing crossings and determine updated crossing sizes.

Level Of Study Completed
Seeking funding for preliminary data collection, hydrology and hydraulics, preliminary design, and a report outlining the costs of the improvement project.

Describe Potential Obstacles To Implementation

Land Acquisition
N/A

Permits
N/A

Funding
No obstacles expected

Local Opposition
N/A

Environmental Concerns
N/A

Other
N/A

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$12,375.00	$12,375.00	$	$
Other State	$0.00	$	$	$
Local	$15,125.00	$15,125.00	$	$
Total	$27,500.00	$27,500.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
DWR	$ 12,375.00	Grant		%
Maple River WRD	$ 15,125.00	n/a		%
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status
Complete preliminary design spring of 2022.

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)
	3/2022	TBD

Construction Start (Month/Year)	Construction Completion (Month/Year)
TBD	TBD

Has Economic Analysis Been Completed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable

Has Life Cycle Cost Analysis Been Completed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable

Has Feasibility Study Been Completed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable

Has Engineering Design Been Completed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable

Have Land Or Easements Been Acquired? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable

Have Assessment Districts Been Formed? ☒ Yes ☐ No ☐ Ongoing ☐ Not Applicable — If Yes, (Date)? January 2012

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☒ No

Have You Applied For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Submitted By	Date
Maple River Water Resource District - Carol Harbeke Lewis, Secretary-Treasurer	

Address	City	State	ZIP Code
1201 Main Avenue West	West Fargo	ND	58078

Sponsor's Telephone Number	Sponsor's Email Address
(701) 298-2381	LewisC@casscountynd.gov
Engineer's Name	**Engineer's Telephone Number**
Alexa Ducioame	(701) 282-4692
Engineer's Company	**Engineer's Email Address**
Moore Engineering, Inc.	alexa.ducioame@mooreengineeringinc.com

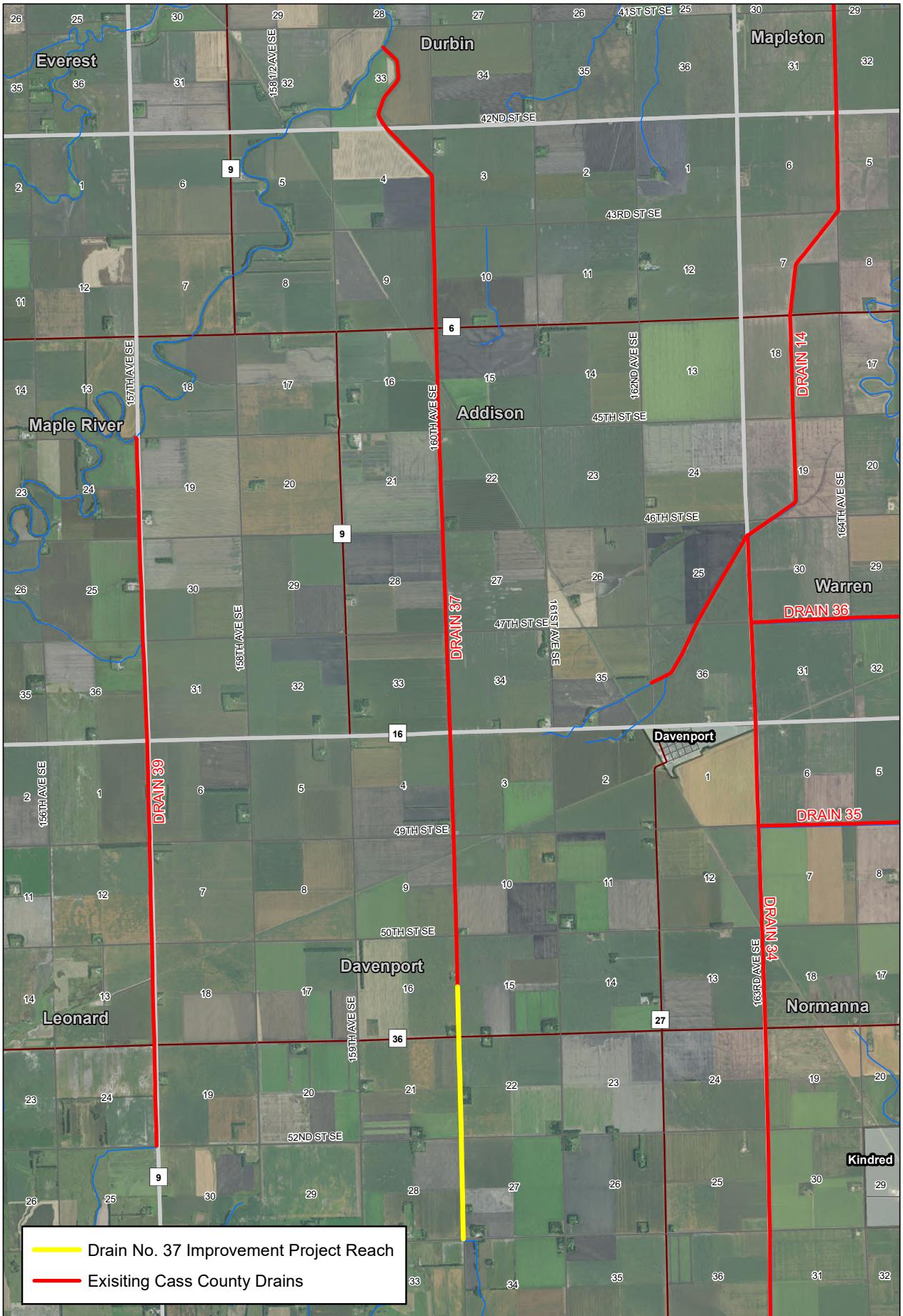
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Carol Harbeke Lewis Digitally signed by Carol Harbeke Lewis Date: 2021.10.26 10:57:53 -05'00'	10/21/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email



Cass County Drain No. 37 Improvement Project
Maple River Water Resource District
Cass County, North Dakota

Created By: AKS Date Created: 10/11/2021 Date Saved: 10/11/21 Date Plotted: NEVER Date Exported: 10/11/21
Plotted By: andrew.smith Parcel Date: XX/XX/20 Aerial Image: 2019 County NAIP SIDS Elevation Data: Lidar
Horizontal Datum: NAD 1983 UTM Zone 14N Vertical Datum: NAVD1988
T:\Projects\22200\22211\22211_ProjectMap_20211011.mxd

N W E S

0 0.25 0.5 1 1.5 Miles

moore engineering, inc.

DELINEATION OF COSTS
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING AND EDUCATION
SFN 61801 (10/2021)

DWR Date Received : Month Day, Year

Project:	Cass County Drain No. 37 Improvement Project
Sponsor:	Maple River Water Resource District
Contact:	Carol Lewis - Secretary-Treasurer
Phone:	(701) 298-2381
Engineer:	Moore Engineering, Inc.
Phone:	(701) 282-4692

Total Cost :	$ 27,500
Ineligible Cost :	$ -
Eligible Cost :	$ 27,500
Local Cost :	$ 15,100

Date: October 1, 2021

	Cost-Share $
	$ 12,400
Preconstruction :	$ 12,375
Construction :	$ -

Project Type:	**Cost-share %**
Rural Flood Control - Drains, Channel, Diversion	45%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	#DIV/0!		0			$ -	45%	$ -
2	#DIV/0!		0		-	$ -	45%	$ -
3	#DIV/0!		0		-	$ -	45%	$ -
4	#DIV/0!		0		-	$ -	45%	$ -
5	#DIV/0!		0		-	$ -	45%	$ -
6	#DIV/0!		0		-	$ -	45%	$ -
7	#DIV/0!		0		-	$ -	45%	$ -
8	#DIV/0!		0		-	$ -	45%	$ -
9	#DIV/0!		0		-	$ -	45%	$ -
10	#DIV/0!		0		-	$ -	45%	$ -
11	#DIV/0!		0		-	$ -	45%	$ -
12	#DIV/0!		0		-	$ -	45%	$ -
13	#DIV/0!		0		-	$ -	45%	$ -
14	#DIV/0!		0		-	$ -	45%	$ -
15	#DIV/0!		0		-	$ -	45%	$ -
16	#DIV/0!		0		-	$ -	45%	$ -
17	#DIV/0!		0		-	$ -	45%	$ -
18	#DIV/0!		0		-	$ -	45%	$ -
19	#DIV/0!		0		-	$ -	45%	$ -
20	#DIV/0!		0		-	$ -	45%	$ -
21	#DIV/0!		0		-	$ -	45%	$ -
22	#DIV/0!		0		-	$ -	45%	$ -
23	#DIV/0!		0		-	$ -	45%	$ -
24	#DIV/0!		0		-	$ -	45%	$ -
25	#DIV/0!		0		-	$ -	45%	$ -
26	#DIV/0!		0		-	$ -	45%	$ -
		Construction Sub-Total				$ -	45%	$ -
	0.0%	**Contingency**				$ -	45%	$ -
	0.0%	**Construction Total**				$ -	45%	$ -
		Preconstruction Costs						
27	#DIV/0!	Preliminary Design	1	NA	27,500.00	$ 27,500	45%	$ 12,375
28	#DIV/0!		0		-	$ -	45%	$ -
29	#DIV/0!		0		-	$ -	45%	$ -
30	#DIV/0!		0		-	$ -	45%	$ -
31	#DIV/0!		0		-	$ -	45%	$ -
	100.0%	**Preconstruction Total**				$ 27,500	45%	$ 12,375
		Construction Engineering Costs						
32	#DIV/0!		0		-	$ -	45%	$ -
33	#DIV/0!		0		-	$ -	45%	$ -
34	#DIV/0!		0		-	$ -	45%	$ -
35	#DIV/0!		0		-	$ -	45%	$ -
36	#DIV/0!		0		-	$ -	45%	$ -
	0.0%	**Construction Engineering Total**				$ -	0%	$ -
		Other Eligible Costs						
37	0.0%		0			$ -	45%	$ -
38	0.0%		0		-	$ -	45%	$ -
39	0.0%		0		-	$ -	45%	$ -
40	0.0%		0		-	$ -	45%	$ -
41	0.0%		0		-	$ -	45%	$ -
	0.0%	**Other Eligible Total**				$ -	45%	$ -
		In-eligible Costs						
42	0.0%		0			$ -	0%	$ -
43	0.0%		0		-	$ -	0%	$ -
44	0.0%		0		-	$ -	0%	$ -
45	0.0%		0		-	$ -	0%	$ -
	0.0%	**Other Ineligible Total**				$ -	0%	$ -
	100.0%				**Total**	$ 27,500		
					Eligible Total	$ 27,500	45%	$ 12,375
					Federal or State Funds That Supplant Costs	$ -		
					Eligible Cost Total	$ 27,500	45%	$ 12,375

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

Water Development Plan: Yes - 2021 Plan (Page 37)
Priority: Moderate

F3

NORTH Dakota | Water Resources

Be Legendary.

DWR Date Received : 10/26/21

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
Cornell Township Drainage Improvement District No. 80 -	Maple River Water Resource District

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
CHL	*Cost-Share Application Form (SFN 60439)
CHL	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
CHL	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
X	Approved Drainage Permit (Rural Flood Control Only)
X	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
X	Sediment Analysis (Drain Reconstruction Only)
X	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
X	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
X	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
X	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
X	Life Cycle Cost Analysis Worksheet (Water Supply Only)
X	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Carol Harbeke Lewis	Carol Harbeke Lewis — Digitally signed by Carol Harbeke Lewis Date: 2021.10.26 11:51:29 -05'00'	10/26/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/26/21

CASS COUNTY GOVERNMENT

SENT VIA EMAIL

October 26, 2021

Maple River Water Resource District

Rodger Olson
Chairman
Leonard, North Dakota

Gerald Melvin
Manager
Buffalo, North Dakota

Chad Miller
Manager
Buffalo, North Dakota

Carol Harbeke Lewis
Secretary-Treasurer

1201 Main Avenue West
West Fargo, ND 58078-1301

701-298-2381
FAX 701-298-2397
wrd@casscountynd.gov
www.casscountynd.gov

Beth Nangare
Cost Share Program Administrator
North Dakota Department of Water Resources
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

Dear Beth:

RE: Cornell Township Drainage Improvement District No. 80
Cornell Township, Cass County, North Dakota

Landowners in Cornell Township in Cass County have submitted a Petition and Bond to the Maple River Water Resource District (the "District") to form Cornell Township Drainage Improvement District No. 80 (the "Project"). The District will be completing preliminary engineering design, assessment district development and an assessment vote of the benefitted landowners.

The area of the proposed Project is experiencing significant water management issues including large areas of standing water resulting in crop loss and threats to public infrastructure. The preliminary design of the Project would include preliminary design survey along the Project alignment, preliminary engineering design and cost estimation, utility investigation, and preliminary benefit analysis and assessment district development. If the vote of the benefitted landowners is successful, the District will continue with final design and construction.

The Project will begin in the SW 1/4 of Section 22 in Cornell Township (T141N, R55W) at the Project outlet into existing Cass County Drain No. 46. The Project will follow the existing flowpath upstream through Sections 21, 28, 29, 30, and 31 of Cornell Township, terminating at 30th Street Southeast. The Project will also include three potential laterals. An open channel lateral through the E 1/2 of Section 20 and tile laterals in both the E 1/2 of Section 29 and the NE 1/4 of Section 28 along the south side of 28th Street Southeast.

Pursuant to current Department of Water Resources (DWR) cost-share policy, the District respectfully requests 45% cost-share for the Project study. Enclosed with this letter is the Water Resources Cost-Share Application Checklist and Cost-Share Request Form with required documents.

If you have any questions, please feel free to contact us or our project engineer, Kurt Lysne, Moore Engineering, Inc., at 701-282-4692.

Sincerely,

MAPLE RIVER WATER RESOURCE DISTRICT

Carol Harbeke Lewis
Secretary-Treasurer

Attachments

DWR Date Received : 10/26/21

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
Cornell Township Drainage Improvement District No. 80 - Preliminary Engineering

Sponsor(s)
Maple River Water Resource District

County	City	Township/Range/Section
Cass	Cornell	141/55/20, 21, 28, 29, 30, 31

Request Type ☒ New ☐ Updated (previously submitted)

Description Type ☒ Pre-Construction ☐ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☐ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☒ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project

Maple River Water Resource District
Cass County
Local Landowners

Description Of Problem Or Need And How The Project Provides A Solution

The area of the proposed project is experiencing significant water management issues including large areas of standing water resulting in crop loss and threats to public infrastructure. The preliminary design of the project would include survey of the area, preliminary engineering design and cost estimation, utility investigation, preliminary benefit analysis and assessment district development, and a vote of the benefited landowners.

Level Of Study Completed

Preliminary project development including project location and watershed analysis. Seeking funding for preliminary data collection, hydrology and hydraulics, preliminary design, and a report outlining the costs of the improvement project.

Describe Potential Obstacles To Implementation

Land Acquisition
N/A

Permits
N/A

Funding
No obstacles expected

Local Opposition
N/A

Environmental Concerns
N/A

Other
N/A

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$31,500.00	$31,500.00	$	$
Other State	$0.00	$	$	$
Local	$38,500.00	$38,500.00	$	$
Total	$70,000.00	$70,000.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
DWR	$ 31,500.00	Grant		%
Maple River WRD	$ 38,500.00	n/a		%
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status
Complete preliminary design spring of 2022. Project vote to be held in Spring or Summer 2022.

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)
	3/2022	TBD

Construction Start (Month/Year)	Construction Completion (Month/Year)
TBD	TBD

Has Economic Analysis Been Completed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable

Has Life Cycle Cost Analysis Been Completed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable

Has Feasibility Study Been Completed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable

Has Engineering Design Been Completed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable

Have Land Or Easements Been Acquired? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable

Have Assessment Districts Been Formed? ☐ Yes ☒ No ☐ Ongoing ☐ Not Applicable | If Yes, (Date)?

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☒ No

Have You Applied For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Submitted By	Date
Maple River Water Resource District - Carol Harbeke Lewis, Secretary-Treasurer	

Address	City	State	ZIP Code
1201 Main Avenue West	West Fargo	ND	58078

Sponsor's Telephone Number	Sponsor's Email Address
(701) 298-2381	LewisC@casscountynd.gov
Engineer's Name	**Engineer's Telephone Number**
Kurt Lysne	(701) 282-4692
Engineer's Company	**Engineer's Email Address**
Moore Engineering, Inc.	kurt.lysne@mooreengineeringinc.com

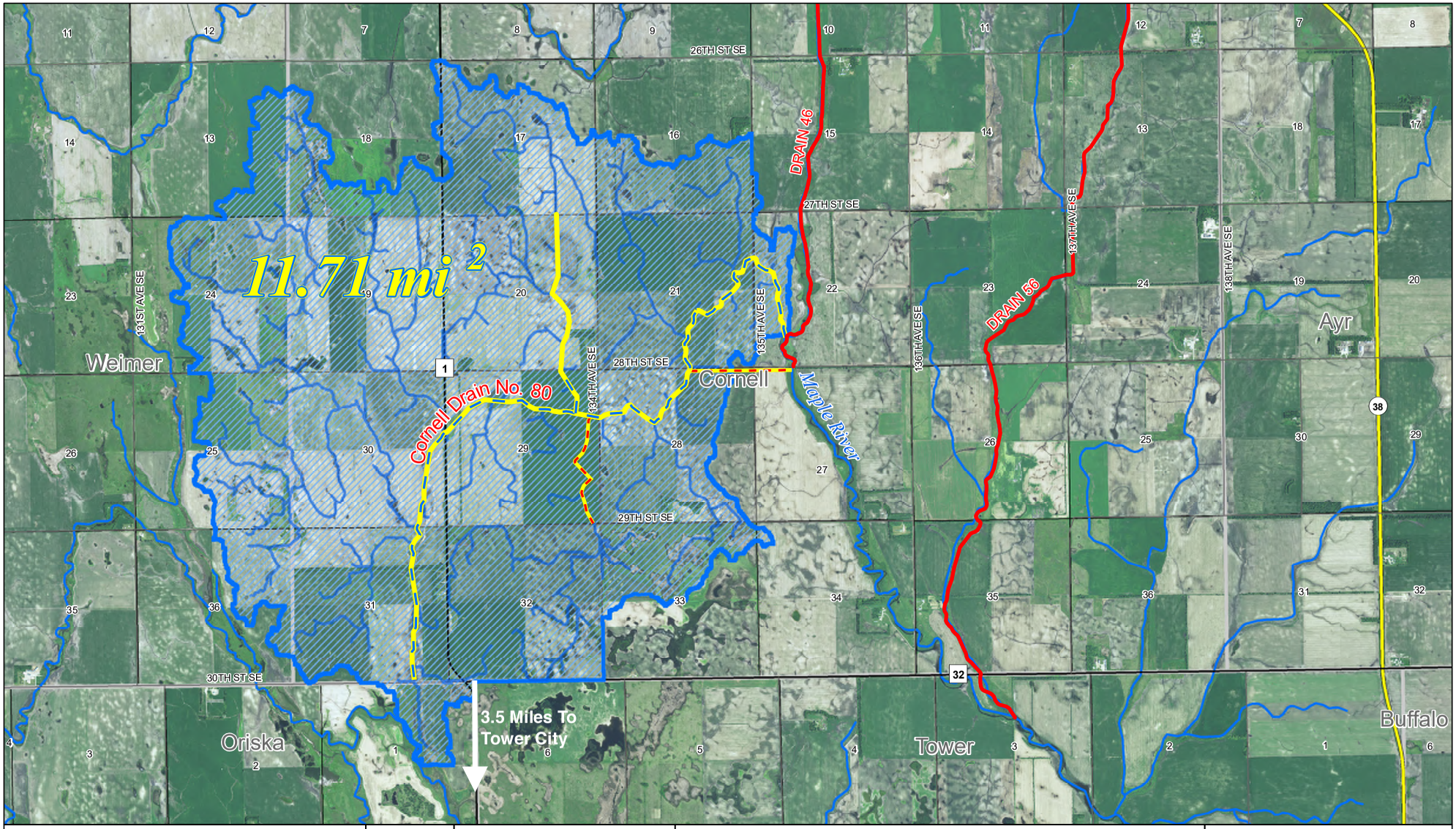
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Carol Harbeke Lewis Digitally signed by Carol Harbeke Lewis Date: 2021.10.26 11:51:02 -05'00'	10/21/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email



Cornell Drainage Improvement District No 80
Project Map and Watershed Area
Cass County, North Dakota

Created By: AKS Date Created: 09/16/2020 Date Saved: 06/01/21 Date Plotted: NEVER Date Exported: 06/01/21
Plotted By: andrew.smith Parcel Date: XX/XX/18 Aerial Image: 2019 County NAIP SIDS Elevation Data: Lidar
Horizontal Datum: NAD 1983 UTM Zone 14N Vertical Datum: NAVD1988
T:\Projects\21200\21213\Cornell_No80_WatershedMap.mxd

N W E S

0 500 1,000 2,000 3,000 4,000 Feet

- Legal Drains
- Potential Lateral Extension
- Project Alignment - Open Channel
- Potential Tile Lateral
- Project Watershed Area

moore engineering, inc.

DELINEATION OF COSTS
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING AND EDUCATION
SFN 61801 (10/2021)

DWR Date Received : Month Day, Year

Project:	Cornell Township Drainage Improvement District No. 80
Sponsor:	Maple River Water Resource District
Contact:	Carol Lewis - Secretary-Treasurer
Phone:	(701) 298-2381
Engineer:	Kurt Lysne - Moore Engineering, Inc.
Phone:	(701) 282-4692

Total Cost :	$ 70,000
Ineligible Cost :	$ -
Eligible Cost :	$ 70,000
Local Cost :	$ 38,500

Date: October 1, 2021

	Cost-Share $
	$ 31,500
Preconstruction :	$ 31,500
Construction :	$ -

Project Type:	**Cost-share %**
Rural Flood Control - Drains, Channel, Diversion	45%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	#DIV/0!		0			$ -	45%	$ -
2	#DIV/0!		0		-	$ -	45%	$ -
3	#DIV/0!		0		-	$ -	45%	$ -
4	#DIV/0!		0		-	$ -	45%	$ -
5	#DIV/0!		0		-	$ -	45%	$ -
6	#DIV/0!		0		-	$ -	45%	$ -
7	#DIV/0!		0		-	$ -	45%	$ -
8	#DIV/0!		0		-	$ -	45%	$ -
9	#DIV/0!		0		-	$ -	45%	$ -
10	#DIV/0!		0		-	$ -	45%	$ -
11	#DIV/0!		0		-	$ -	45%	$ -
12	#DIV/0!		0		-	$ -	45%	$ -
13	#DIV/0!		0		-	$ -	45%	$ -
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16	#DIV/0!		0		-	$ -	45%	$ -
17	#DIV/0!		0		-	$ -	45%	$ -
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19	#DIV/0!		0		-	$ -	45%	$ -
20	#DIV/0!		0		-	$ -	45%	$ -
21	#DIV/0!		0		-	$ -	45%	$ -
22	#DIV/0!		0		-	$ -	45%	$ -
23	#DIV/0!		0		-	$ -	45%	$ -
24	#DIV/0!		0		-	$ -	45%	$ -
25	#DIV/0!		0		-	$ -	45%	$ -
26	#DIV/0!		0		-	$ -	45%	$ -
		Construction Sub-Total				$ -	45%	$ -
	0.0%	**Contingency**				$ -	45%	$ -
	0.0%	**Construction Total**				$ -	45%	$ -
		Preconstruction Costs						
27	#DIV/0!	Preliminary Design	1	NA	70,000.00	$ 70,000	45%	$ 31,500
28	#DIV/0!		0		-	$ -	45%	$ -
29	#DIV/0!		0		-	$ -	45%	$ -
30	#DIV/0!		0		-	$ -	45%	$ -
31	#DIV/0!		0		-	$ -	45%	$ -
	100.0%	**Preconstruction Total**				$ 70,000	45%	$ 31,500
		Construction Engineering Costs						
32	#DIV/0!		0		-	$ -	45%	$ -
33	#DIV/0!		0		-	$ -	45%	$ -
34	#DIV/0!		0		-	$ -	45%	$ -
35	#DIV/0!		0		-	$ -	45%	$ -
36	#DIV/0!		0		-	$ -	45%	$ -
	0.0%	**Construction Engineering Total**				$ -	0%	$ -
		Other Eligible Costs						
37	0.0%		0			$ -	45%	$ -
38	0.0%		0		-	$ -	45%	$ -
39	0.0%		0		-	$ -	45%	$ -
40	0.0%		0		-	$ -	45%	$ -
41	0.0%		0		-	$ -	45%	$ -
	0.0%	**Other Eligible Total**				$ -	45%	$ -
		In-eligible Costs						
42	0.0%		0			$ -	0%	$ -
43	0.0%		0		-	$ -	0%	$ -
44	0.0%		0		-	$ -	0%	$ -
45	0.0%		0		-	$ -	0%	$ -
	0.0%	**Other Ineligible Total**				$ -	0%	$ -
	100.0%				**Total**	$ 70,000		
					Eligible Total	$ 70,000	45%	$ 31,500
					Federal or State Funds That Supplant Costs	$ -		
					Eligible Cost Total	$ 70,000	45%	$ 31,500

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

F4

NORTH Dakota | Water Resources

Be Legendary.

DWR Date Received : 10/25/21

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
2021-2022 Sheyenne River Snagging & Clearing	Southeast Cass Water Resource District

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
CHL	*Cost-Share Application Form (SFN 60439)
CHL	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
CHL	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
n/a	Approved Drainage Permit (Rural Flood Control Only)
n/a	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
n/a	Sediment Analysis (Drain Reconstruction Only)
n/a	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
n/a	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
n/a	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
n/a	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
n/a	Life Cycle Cost Analysis Worksheet (Water Supply Only)
n/a	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Carol Harbeke Lewis	Carol Harbeke Lewis — Digitally signed by Carol Harbeke Lewis Date: 2021.10.25 16:34:17 -05'00'	10/25/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/25/21

CASS COUNTY GOVERNMENT

SENT VIA EMAIL

Southeast Cass Water Resource District

Dan Jacobson
Chairman
West Fargo, North Dakota

Keith Weston
Manager
Fargo, North Dakota

Dave Branson
Manager
Fargo, North Dakota

October 25, 2021

Beth Nangare
Cost Share Program Administrator
North Dakota Department of Water Resources
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

Dear Beth:

RE: 2021-2022 Sheyenne River Snagging and Clearing
Sheyenne River from State Highway 46 to the Red River

The Southeast Cass Water Resource District requests cost-share assistance for the Sheyenne River Snagging and Clearing Project that we plan to complete this winter. The project is needed to protect bridges, roads, and other hydraulic structures in addition to properties and residences adjacent to the river. Attached please find the following:

- Water Resources Cost-Share Application Checklist;
- Water Resources Cost-Share Request Form;
- Project specifications;
- Map illustrating the extent of the project;
- Past project photos; and
- Project cost delineation.

If you have any questions, please feel free to contact us or our project engineer, Kurt Lysne, Moore Engineering, Inc., at 701-499-5856.

Thank you.

Sincerely,

SOUTHEAST CASS WATER RESOURCE DISTRICT

Carol Harbeke Lewis
Secretary-Treasurer

Carol Harbeke Lewis
Secretary-Treasurer

1201 Main Avenue West
West Fargo, ND 58078-1301

701-298-2381
FAX 701-298-2397
wrd@casscountynd.gov
casscountynd.gov

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
2021-2022 Sheyenne River Snagging & Clearing

Sponsor(s)
Southeast Cass Water Resource District (WRD)

County	City	Township/Range/Section
Cass		Sheyenne River

Request Type ☐ New ☐ Updated (previously submitted)

Description Type ☐ Pre-Construction ☒ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☒ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☐ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
Southeast Cass WRD and local landowners

Description Of Problem Or Need And How The Project Provides A Solution
Snagging & Clearing (S&C) - Removal and disposal of fallen trees and associated debris within or along the river. The intent of the project is to clear the watercourse to maintain the hydraulic capacity of the channel and prevent damage to structures.

The Sheyenne River requires regular snagging and clearing to keep the river clear of obstructions. The purpose of the project is to remove and dispose of fallen trees and debris in the river, in accordance with the current ND SWC policy for snagging and clearing projects.

Level Of Study Completed
The WRD determines the need for S&C on a regular basis. If work is needed, the WRD applies for cost-share assistance. Local landowners are contacted prior to work being completed in the river.

Describe Potential Obstacles To Implementation

Land Acquisition
No new easement acquisition is required for this project

Permits
No permits will be required

Funding
The WRD will be unable to provide enough funding to complete this project without additional assistance

Local Opposition
None is anticipated at this time

Environmental Concerns
None

Other
None

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$98,000.00	$98,000.00	$	$
Other State	$0.00	$	$	$
Local	$98,000.00	$98,000.00	$	$
Total	$196,000.00	$196,000.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
DWR	$ 98,000.00	Grant		%
Local	$ 98,000.00			%
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status
The Project will begin when safe ice conditions allow during the winter of 2021-2022.

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)

Construction Start (Month/Year)	Construction Completion (Month/Year)
Winter 2021-2022	Winter 2021-2022

Has Economic Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	
Has Life Cycle Cost Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	
Has Feasibility Study Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	
Has Engineering Design Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	
Have Assessment Districts Been Formed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable	If Yes, (Date)?
Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality?	☐ Yes	☐ No			

Have You Applied For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Submitted By	Date
Southeast Cass Water Resource District - Carol Harbeke Lewis, Secretary-Treasurer	

Address	City	State	ZIP Code
1201 Main Avenue West	West Fargo	ND	58078

Sponsor's Telephone Number	Sponsor's Email Address
701-298-2381	lewisc@casscountynd.gov
Engineer's Name	**Engineer's Telephone Number**
Kurt Lysne	701-499-5856
Engineer's Company	**Engineer's Email Address**
Moore Engineering, Inc.	kurt.lysne@mooreengineeringinc.com

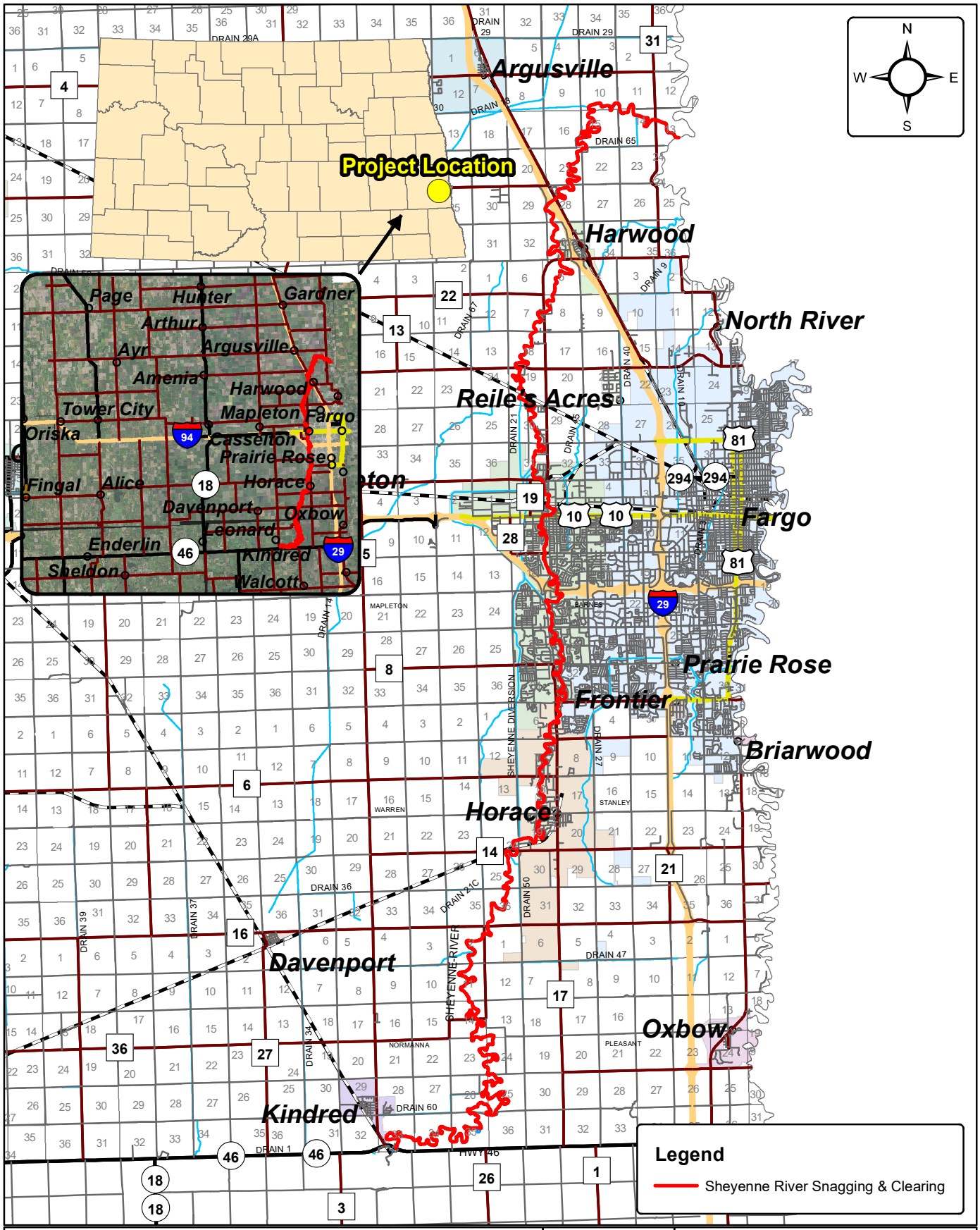
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Carol Harbeke Lewis Digitally signed by Carol Harbeke Lewis Date: 2021.10.25 16:33:44 -05'00'	10/25/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email



2021-2022 Sheyenne River Snagging & Clearing

T140N - R49W, T141N - R49W
Cass County, North Dakota

CASS COUNTY GOVERNMENT
Southeast Cass Water Resource District

moore engineering, inc.

DELINEATION OF COSTS
NORTH DAKOTA WATER COMMISSION
PLANNING DIVISION
SFN 61801 (4/2020)

SWC Date Received : Month Day, Year

Project Costs

Date: October 21, 2021

Project:	2021-2022 Sheyenne River Snagging & Clearing
Sponsor:	Southeast Cass Water Resource District
Contact:	Carol Harbeke Lewis - Secretary-Treasurer
Phone:	701-298-2381
Engineer:	Kurt Lysne - Moore Engineering, Inc.
Phone:	701-499-5856

Total Cost :	$ 196,000
Ineligible Cost :	$ -
Eligible Cost :	$ 196,000

Cost-Share $: $ 98,000

Project Type: Snagging & Clearing

Cost-share %: 50%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	90.9%	Construction	1	LS	160,000.00	$ 160,000.00	50%	$ 80,000.00
2	0.0%					$ -	50%	$ -
3	0.0%				-	$ -	50%	$ -
4	0.0%				-	$ -	50%	$ -
5	0.0%				-	$ -	50%	$ -
6	0.0%				-	$ -	50%	$ -
7	0.0%				-	$ -	50%	$ -
8	0.0%				-	$ -	50%	$ -
9	0.0%				-	$ -	50%	$ -
10	0.0%				-	$ -	50%	$ -
11	0.0%				-	$ -	50%	$ -
12	0.0%				-	$ -	50%	$ -
13	0.0%				-	$ -	50%	$ -
14	0.0%				-	$ -	50%	$ -
15	0.0%				-	$ -	50%	$ -
16	0.0%				-	$ -	50%	$ -
17	0.0%				-	$ -	50%	$ -
18	0.0%				-	$ -	50%	$ -
19	0.0%				-	$ -	50%	$ -
20	0.0%				-	$ -	50%	$ -
		Construction Sub-Total				$ 160,000.00	50%	$ 80,000.00
	10.0%	**Contingency**				$ 16,000.00	50%	$ 8,000.00
	89.8%	**Construction Total**				$ 176,000.00	50%	$ 88,000.00
		Engineering Costs						
21	11.4%	Construction Engineering	1	NA	20,000.00	$ 20,000.00	50%	$ 10,000.00
22	0.0%					$ -	50%	$ -
23	0.0%				-	$ -	50%	$ -
24	0.0%				-	$ -	50%	$ -
25	0.0%				-	$ -	50%	$ -
26	0.0%				-	$ -	50%	$ -
26	0.0%				-	$ -	50%	$ -
27	0.0%				-	$ -	50%	$ -
	10.2%	**Engineering Total**				$ 20,000.00	50%	$ 10,000.00
		Other Eligible Costs						
28	0.0%					$ -	50%	$ -
29	0.0%				-	$ -	50%	$ -
30	0.0%				-	$ -	50%	$ -
31	0.0%				-	$ -	50%	$ -
32	0.0%				-	$ -	50%	$ -
33	0.0%				-	$ -	50%	$ -
34	0.0%				-	$ -	50%	$ -
35	0.0%				-	$ -	50%	$ -
	0.0%	**Other Eligible Total**				$ -	50%	$ -
		In-eligible Costs						
36	0.0%				-	$ -	0%	$ -
37	0.0%				-	$ -	0%	$ -
38	0.0%				-	$ -	0%	$ -
39	0.0%				-	$ -	0%	$ -
40	0.0%				-	$ -	0%	$ -
41	0.0%				-	$ -	0%	$ -
42	0.0%				-	$ -	0%	$ -
43	0.0%				-	$ -	0%	$ -
	0.0%	**Other Ineligible Total**				$ -	0%	$ -
	100.0%	**Total**				$ 196,000.00		
		Eligible Total				$ 196,000.00	50%	$ 98,000.00
		Federal or State Funds That Supplant Costs				$ -		
		Eligible Cost Total				$ 196,000.00	50%	$ 98,000.00

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

Water Development Plan: Yes - 2021 (Page 43)
Plan Priority: Low

F5

NORTH Dakota | Water Resources

Be Legendary.

DWR Date Received : 10/26/21

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
2021-2022 Wild Rice River Snagging & Clearing	Southeast Cass Water Resource District

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
CHL	*Cost-Share Application Form (SFN 60439)
CHL	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
CHL	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
n/a	Approved Drainage Permit (Rural Flood Control Only)
n/a	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
n/a	Sediment Analysis (Drain Reconstruction Only)
n/a	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
n/a	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
n/a	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
n/a	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
n/a	Life Cycle Cost Analysis Worksheet (Water Supply Only)
n/a	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Carol Harbeke Lewis	Carol Harbeke Lewis — Digitally signed by Carol Harbeke Lewis Date: 2021.10.26 00:00:25 -05'00'	10/26/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/26/21

CASS COUNTY GOVERNMENT

SENT VIA EMAIL

October 26, 2021

Southeast Cass Water Resource District

Dan Jacobson
Chairman
West Fargo, North Dakota

Keith Weston
Manager
Fargo, North Dakota

Dave Branson
Manager
Fargo, North Dakota

Beth Nangare
Cost Share Program Administrator
North Dakota Department of Water Resources
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

Dear Beth:

RE: 2021-2022 Wild Rice River Snagging and Clearing
State Highway 46 downstream to the Red River of the North

The Southeast Cass Water Resource District requests cost-share assistance for the above referenced Wild Rice River Snagging and Clearing Project that we plan to complete this winter. The project is needed to protect bridges, roads, and other hydraulic structures in addition to properties and residences adjacent to the river. Attached please find the following:

- Water Resources Cost-Share Application Checklist;
- Water Resources Cost-Share Request Form;
- Project specifications;
- Map illustrating the extent of the project;
- Past project photos; and
- Project cost delineation.

If you have any questions, please feel free to contact us or our project engineer, Kurt Lysne, Moore Engineering, Inc., at 701-499-5856.

Thank you.

Sincerely,

SOUTHEAST CASS WATER RESOURCE DISTRICT

Carol Harbeke Lewis
Secretary-Treasurer

Carol Harbeke Lewis
Secretary-Treasurer

1201 Main Avenue West
West Fargo, ND 58078-1301

701-298-2381
FAX 701-298-2397
wrd@casscountynd.gov
casscountynd.gov

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
2021-2022 Wild Rice River Snagging & Clearing

Sponsor(s)
Southeast Cass Water Resource District

County	City	Township/Range/Section
Cass		

Request Type ☒ New ☐ Updated (previously submitted)

Description Type ☐ Pre-Construction ☒ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☒ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☐ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
Southeast Cass Water Resource District and local landowners

Description Of Problem Or Need And How The Project Provides A Solution
Snagging & Clearing (S&C) - Removal and disposal of fallen trees and associated debris within or along the river. The intent of the project is to clear the watercourse to maintain the hydraulic capacity of the channel and prevent damage to structures.

The Wild Rice River requires regular snagging and clearing to keep the river clear of obstructions. The purpose of the project is to remove and dispose of fallen trees and debris in the river, in accordance with the current ND SWC policy for snagging and clearing projects.

Level Of Study Completed
The WRD determines the need for S&C on a regular basis. If work is needed, the WRD contacts the local landowners prior to work being completed in the river.

Describe Potential Obstacles To Implementation

Land Acquisition
No new easement acquisition is required for this project

Permits
No permits will be required

Funding
The WRD will be unable to provide enough funding to complete this project without additional assistance

Local Opposition
None is anticipated at this time

Environmental Concerns
None

Other
None

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$98,000.00	$98,000.00	$	$
Other State	$0.00	$	$	$
Local	$98,000.00	$98,000.00	$	$
Total	$196,000.00	$196,000.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
DWR	$ 98,000.00			%
Local	$ 98,000.00			%
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status
The Project will begin when safe ice conditions allow during the winter of 2021-2022.

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)

Construction Start (Month/Year)	Construction Completion (Month/Year)
Winter 2021-2022	Winter 2021-2022

Has Economic Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Has Life Cycle Cost Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Has Feasibility Study Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable

Have Assessment Districts Been Formed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable — If Yes, (Date)?

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☒ No

Have You Applied For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Submitted By	Date
Southeast Cass Water Resource District - Carol Harbeke Lewis, Secretary-Treasurer	

Address	City	State	ZIP Code
1201 Main Avenue West	West Fargo	ND	58078

Sponsor's Telephone Number	Sponsor's Email Address
701-298-2381	lewisc@casscountynd.gov
Engineer's Name	**Engineer's Telephone Number**
Kurt Lysne	701-499-5856
Engineer's Company	**Engineer's Email Address**
Moore Enigneering, Inc	kurt.lysne@mooreengineeringinc.com

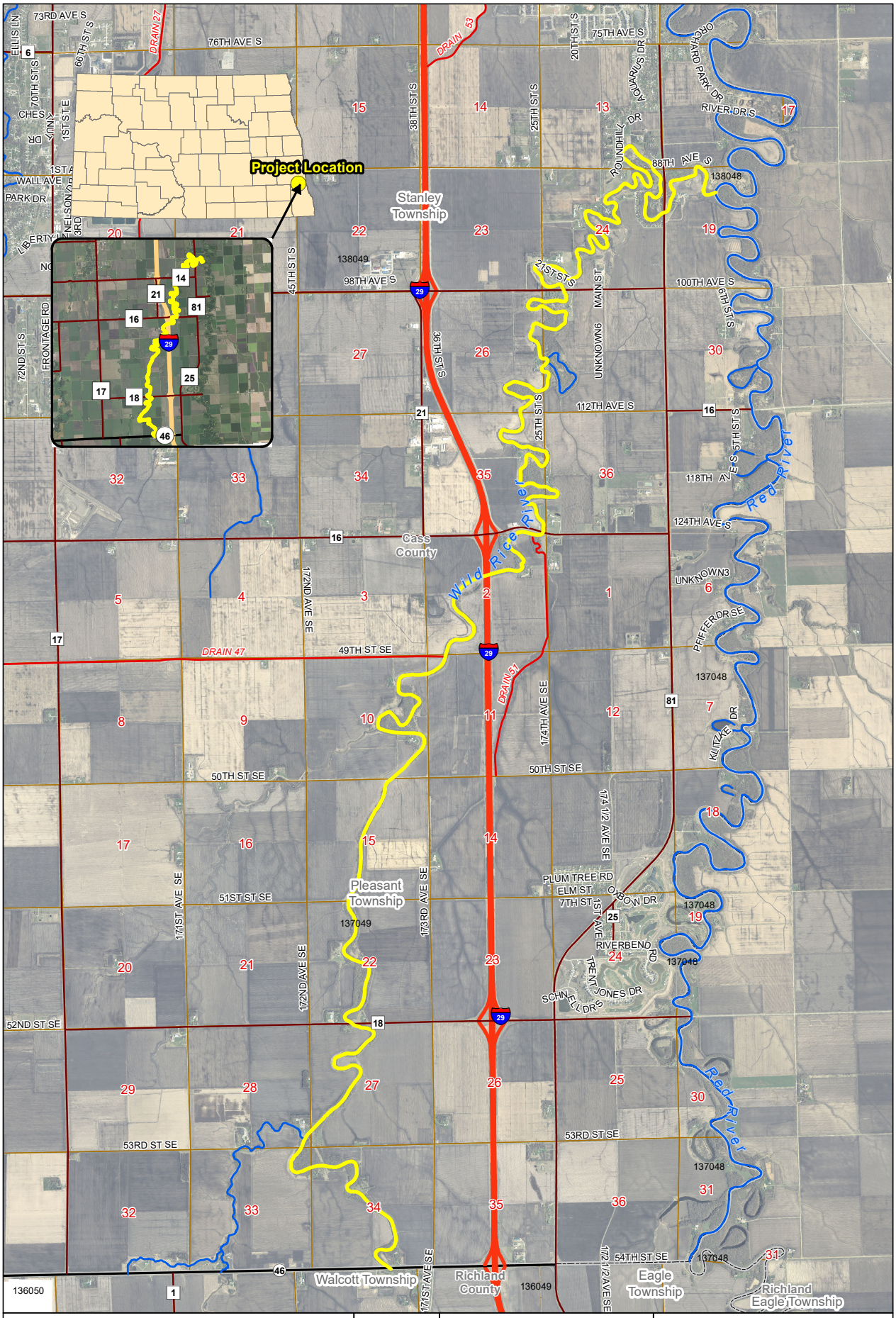
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
Carol Harbeke Lewis Digitally signed by Carol Harbeke Lewis Date: 2021.10.25 23:59:56 -05'00'	10/26/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email



WILD RICE RIVER SNAGGING & CLEARING
STATE HIGHWAY 49 TO RED RIVER
CASS COUNTY, NORTH DAKOTA

Created By: KMV Date Created: 01/28/21 Date Saved: 10/20/21 Date Exported: 10/21/21
Plotted By: andrew.smith Parcel Date: 01/28/21 Aerial Image: 2020 County NAIP SIDS Elevation Data: N/A
Horizontal Datum: NAD 1983 StatePlane North Dakota South FIPS 3302 Feet Vertical Datum: NAVD1988
T:\Projects\15500\15590\15590A-601_Wild_Rice_River_S_C_2021.mxd

N W E S

0 0.35 0.7 1.4 Miles
1 in = 0.7 miles

moore engineering, inc.

DELINEATION OF COSTS
NORTH DAKOTA WATER COMMISSION
PLANNING DIVISION
SFN 61801 (4/2020)

SWC Date Received : Month Day, Year

Project Costs

Date: October 20, 2021

Project:	2021-2022 Wild Rice River Snagging & Clearing
Sponsor:	Southeast Cass Water Resource District
Contact:	Carol Harbeke Lewis - Secretary-Treasurer
Phone:	701-298-2381
Engineer:	Kurt Lysne - Moore Engineering, Inc.
Phone:	701-499-5856

Total Cost :	$ 196,000
Ineligible Cost :	$ -
Eligible Cost :	$ 196,000

Cost-Share $
$ 98,000

Project Type:	**Cost-share %**
Snagging & Clearing	50%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	90.9%	Construction	1	LS	160,000.00	$ 160,000.00	50%	$ 80,000.00
2	0.0%					$ -	50%	$ -
3	0.0%				-	$ -	50%	$ -
4	0.0%				-	$ -	50%	$ -
5	0.0%				-	$ -	50%	$ -
6	0.0%				-	$ -	50%	$ -
7	0.0%				-	$ -	50%	$ -
8	0.0%				-	$ -	50%	$ -
9	0.0%				-	$ -	50%	$ -
10	0.0%				-	$ -	50%	$ -
11	0.0%				-	$ -	50%	$ -
12	0.0%				-	$ -	50%	$ -
13	0.0%				-	$ -	50%	$ -
14	0.0%				-	$ -	50%	$ -
15	0.0%				-	$ -	50%	$ -
16	0.0%				-	$ -	50%	$ -
17	0.0%				-	$ -	50%	$ -
18	0.0%				-	$ -	50%	$ -
19	0.0%				-	$ -	50%	$ -
20	0.0%				-	$ -	50%	$ -
		Construction Sub-Total				$ 160,000.00	50%	$ 80,000.00
	10.0%	**Contingency**				$ 16,000.00	50%	$ 8,000.00
	89.8%	**Construction Total**				$ 176,000.00	50%	$ 88,000.00
		Engineering Costs						
21	11.4%	Construction Engineering	1	NA	20,000.00	$ 20,000.00	50%	$ 10,000.00
22	0.0%					$ -	50%	$ -
23	0.0%				-	$ -	50%	$ -
24	0.0%				-	$ -	50%	$ -
25	0.0%				-	$ -	50%	$ -
26	0.0%				-	$ -	50%	$ -
26	0.0%				-	$ -	50%	$ -
27	0.0%				-	$ -	50%	$ -
	10.2%	**Engineering Total**				$ 20,000.00	50%	$ 10,000.00
		Other Eligible Costs						
28	0.0%					$ -	50%	$ -
29	0.0%				-	$ -	50%	$ -
30	0.0%				-	$ -	50%	$ -
31	0.0%				-	$ -	50%	$ -
32	0.0%				-	$ -	50%	$ -
33	0.0%				-	$ -	50%	$ -
34	0.0%				-	$ -	50%	$ -
35	0.0%				-	$ -	50%	$ -
	0.0%	**Other Eligible Total**				$ -	50%	$ -
		In-eligible Costs						
36	0.0%				-	$ -	0%	$ -
37	0.0%				-	$ -	0%	$ -
38	0.0%				-	$ -	0%	$ -
39	0.0%				-	$ -	0%	$ -
40	0.0%				-	$ -	0%	$ -
41	0.0%				-	$ -	0%	$ -
42	0.0%				-	$ -	0%	$ -
43	0.0%				-	$ -	0%	$ -
	0.0%	**Other Ineligible Total**				$ -	0%	$ -
	100.0%	**Total**				$ 196,000.00		
		Eligible Total				$ 196,000.00	50%	$ 98,000.00
		Federal or State Funds That Supplant Costs				$ -		
		Eligible Cost Total				$ 196,000.00	50%	$ 98,000.00

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

DWR Date Received : 10/25/21

G1

NORTH Dakota | Water Resources

Be Legendary.

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
Tongue River NRCS Watershed Plan - Implementation	Pembina County Water Resource District

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
	*Cost-Share Application Form (SFN 60439)
	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
X	Approved Drainage Permit (Rural Flood Control Only)
X	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
X	Sediment Analysis (Drain Reconstruction Only)
X	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
X	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
X	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
X	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
X	Life Cycle Cost Analysis Worksheet (Water Supply Only)
X	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

LuAnn Kemp, Secretary		10/25/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/25/21

PEMBINA COUNTY
WATER RESOURCE DISTRICT

308 Courthouse Drive #5
Cavalier, North Dakota 58220
Phone: 701-265-4511
Fax: 701-265-4165

October 25, 2021

ND Department of Water Resources
ATTN: Cost-Share Program
900 E Boulevard Ave.
Bismarck, ND 58505-0850

Subject: **Tongue River NRCS Watershed Plan**
Final Design and Construction
Application for ND Department of Water Resources Cost Share

To Whom It May Concern,

The Pembina County Water Resource District (PCWRD) requests cost-share from the ND Department of Water Resources (DWR) to construct the preferred alternative of the Tongue River NRCS Watershed Plan. The State Water Commission (SWC) approved cost share in March of 2016 to assist in development of the NRCS Watershed Plan. The planning effort ultimately identified accelerated sediment deposition and nutrient loading into Lake Renwick as a significant risk to the region. A reduced lake depth caused by sediment deposition reduces recreational opportunities, as well as function of the dam for downstream flood control, and excess nutrient loading can result in algal blooms that also reduce recreational uses, as well as cause public health concerns.

Renwick Lake is provided by Renwick Dam, which is a prior NRCS project (authority under Public Law 83-566) that provides combined recreation and flood control services. NRCS and the NDSWC jointly funded rehabilitation of Renwick Dam in 2013. Renwick Lake facilitates recreational opportunities of statewide significance due to its proximity to Icelandic State Park. The lake provides fishing, boating, kayaking, swimming, and other water sports. Renwick Dam also provides flood control benefits to flood prone areas along the Tongue River further downstream, including the community of Cavalier, ND.

Sediment deposition in Lake Renwick has been accelerated due to channel incision from historical confinement of the river channel near the Highway 89 crossing, by levees and highway road fill. The severe spring 2013 flood, which was caused by nearly nine inches of rain in the lake's watershed, represents one of the most severe flood events experienced in the watershed. The event, in combination with lateral confinement structures, triggered substantial channel incision along the Tongue River upstream of Lake Renwick and increased the lake's estimated annual sediment load to 55,000 tons per year. Once the channel incision began, instabilities in the channel became self-perpetuating as a deeper and wider channel provided conveyance of more flow at higher velocities and landslides on the steep forested slopes on the south side of the river were initiated. As of 2020, nearly 77% of the planned sediment storage is now full. At the current rate of sediment loading, we expect that the sediment storage in the reservoir will be fully filled by 2027. Shortly before the 2013 flood event, Renwick Dam was rehabilitated and was intended to provide sediment storage until 2113.

The proposed project will restore approximately 1.8 miles of the Tongue River upstream of Lake Renwick. The project will utilize a variety of techniques to restore the channel, including levee removal, riprap and sheet pile grade control structures, reconstruction of a geomorphically stable channel, and wood-toe bank stabilization. The restoration will stabilize the most active reach of channel erosion upstream of the Lake and halt the upstream progression of channel incision, ultimately preserving the beneficial uses of Lake Renwick. The U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, ND Department of Environmental Quality, and ND Game and Fish have been participants in the planning effort and

Board Members

Randall Emanuelson, Charles Thacker, Ted Juhl, Richard Kendall, & Donald Kemp

permitting is expected to progress smoothly as a result. USCOE has indicated that Nationwide Permit 27 (Aquatic Habitat Restoration) will be utilized for the project. Further details are included in the attached documentation.

Because channel incision/erosion within this reach of the Tongue River channel is actively occurring, timing between final design and construction is critical. In order for accurate quantities during bidding, we need to transition from final design to construction as quickly as possible. It is anticipated that final survey work would be completed immediately after spring runoff, final design documents prepared by the end of June, the bid process would take place in July, and construction would proceed from August to November. The actively changing channel will cause actual quantities to vary from bid quantities, ultimately resulting in increased construction costs. Due to this, we request consideration for cost share for both final design (pre-construction) and construction under this request to avoid added costs caused by delaying bidding for another cost share request construction costs.

The total estimated cost for this phase is $4,777,616 of which the NRCS will provide $3,673,900 in federal funding through their Watershed Operations program (Public Law 83-566). The remaining non-federal cost for the project is $1,103,716, of which 40% is eligible under the ND DWR cost share policy as a recreational project by protecting beneficial uses provided by dams. As such, we request consideration for a total cost-share of **$441,100**. Because of the significant federal funding opportunity that is being offered by the NRCS, the ND DWR commitment to the total project would be 9% of overall project costs, representing a savings of nearly $1.5 million of cost share funds. Attached you will find the required cost share submittal items. In addition, the Draft NRCS Watershed Plan-EA is attached.

If you have any questions, feel free to contact our office at (701) 265-4511.

Sincerely,

Pembina County Water Resource District

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
Tongue River NRCS Watershed Plan - Implementation

Sponsor(s)
Pembina County Water Resource District

County	City	Township/Range/Section
Pembina	Rural	T161N, R56W, Sec. 28 & 29

Request Type ☒ New ☐ Updated (previously submitted)

Description Type ☒ Pre-Construction ☒ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☒ Recreation	☐ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☐ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☐ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
Pembina County Water Resource District
Natural Resources Conservation Service
Landowners

Description Of Problem Or Need And How The Project Provides A Solution
Because of it's proximity to Icelandic State Park, Lake Renwick provides recreation of statewide significance. The lake provides an opportunity for park visitors to enjoy boating, fishing, swimming, kayaking, and other water sports. Channel incision on the Tongue River has increased the sediment load to Lake Renwick to 55,000 tons per year since 2013. The sediment pool in Lake Renwick, which was planned to have adequate capacity until year 2113, is 77% full as of 2020. Without the project, the sediment pool would be fully filled by 2027. The recreation (normal) pool of Lake Renwick would be 24% filled by 2040, and fully filled by 2086, effectively turning Renwick Dam into a dry dam or requiring expensive dredging operations to restore the recreational opportunity. The Project will stabilize a highly eroded reach of the Tongue River upstream of Lake Renwick to reduce future sediment loading into the normal pool.

Level Of Study Completed
The Pembina County WRD has worked collaboratively with NRCS to complete an NRCS Watershed Plan-EA. The planning included significant public input, robust alternative evaluation, environmental document, and preliminary design of the preferred alternative. Ultimately, the Watershed Plan-EA provides reassurances that the project is achievable from regulatory, technical feasibility, and public acceptance consideration.

The NRCS Watershed Plan-EA is currently in draft format and under internal reviews. Once finalized, the Watershed Plan-EA will provide federal funding for final design and construction. This presents an opportunity for significant cost savings for state and local funds.

Describe Potential Obstacles To Implementation

Land Acquisition
Affected landowners have been engaged and are accepting of the project.

Permits
The NRCS Watershed Plan-Environmental Assessment (EA) provides reassurances that permits will be able to be secured.

Funding
Federal funding will assist, however a significant non-federal portion remains. DWR cost share is critical for success.

Local Opposition
None.

Environmental Concerns
None.

Other
Timing. Final Design and Construction will have to occur in rapid sequence given the mobility of the current channel.

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$3,673,900.00	$3,673,900.00	$	$
Water Resources	$441,100.00	$441,100.00	$	$
Other State	$0.00	$	$	$
Local	$662,616.00	$662,616.00	$	$
Total	$4,777,616.00	$4,777,616.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
NRCS	$ 3,673,900.00	Grant	NA	NA %
DWR	$ 441,100.00	Grant	NA	NA %
Non-State/Fed (TBD)	$ 662,616.00	TBD	TBD	TBD %
	$			%

Explain Timelines For All Phases And Their Current Status
Final Design - Spring 2022 - Summer 2022
Construction - Late Summer 2022 - Spring 2023

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)
January 2022	July 2022	August 2022

Construction Start (Month/Year)	Construction Completion (Month/Year)
August 2022	June 2023

Has Economic Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Has Life Cycle Cost Analysis Been Completed?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable
Has Feasibility Study Been Completed?	☒ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☐ Ongoing	☒ Not Applicable

Have Assessment Districts Been Formed?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable	If Yes, (Date)?

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☒ No

Have You Applied For Any Federal Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☒ No	☐ Not Applicable

Type	Number
USCOE Section 27 Nationwide Permit	NA

If Yes, Please Explain

The USCOE is a designated Cooperating Agency in the NRCS Watershed Planning effort. Through consultation on the proposed project, the USCOE has indicated that the project would likely fall under Nationwide Permit Section 27 (Aquatic Habitat Restoration).

The USFWS has also participated in the Watershed Planning effort, and no regulatory obstacles are anticipated.

Have You Applied For Any State Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☒ No	☐ Not Applicable

Type	Number

If Yes, Please Explain

State regulatory agencies have been involved in the NRCS Watershed Planning effort, and we do not anticipate any permitting issues as a result.

Have You Applied For Any Local Permits?	☐ Yes	☒ No	☐ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☒ No	☐ Not Applicable

Type	Number

If Yes, Please Explain

Local government units and other agencies have been included in the NRCS Watershed Planning effort, and we do not anticipate any permitting issues as a result.

Submitted By			Date
Pembina County Water Resource District			October 25, 2021
Address	**City**	**State**	**ZIP Code**
308 Court House Drive	Cavalier	ND	58220

Sponsor's Telephone Number (701) 265-4511	Sponsor's Email Address llkemp@nd.gov
Engineer's Name Christi Fisher, PE	Engineer's Telephone Number (701) 530-2091
Engineer's Company NRCS State Conservation Engineer (ND)	Engineer's Email Address christi.fisher@usda.gov

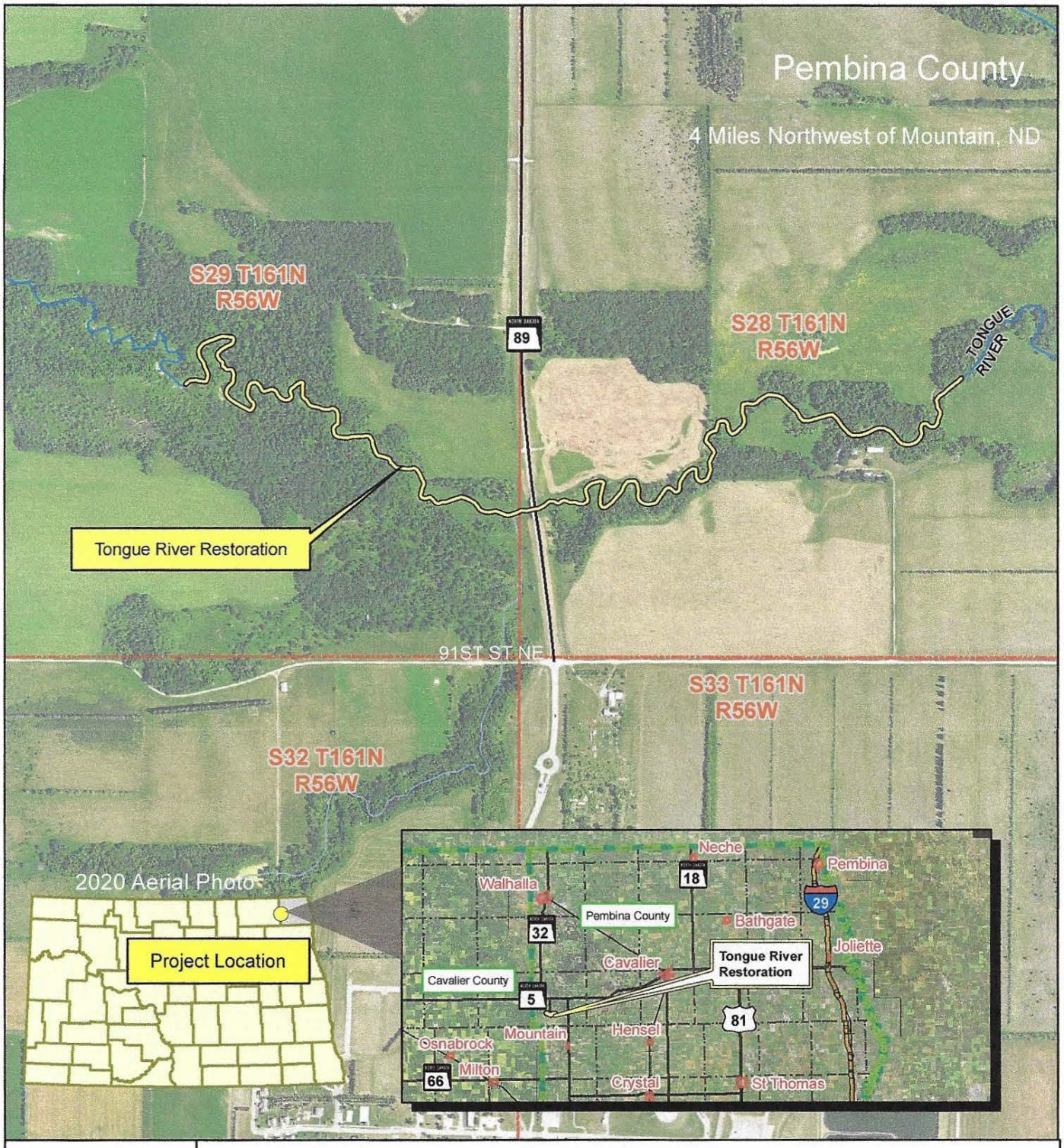
I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

Signature	Date
	10/25/21

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email



Date: 10/21/2021
Prepared by: NRI

2021 Tongue River Restoration

Pembina County Water Resource District

Sections 28 & 29 T161N R56W
Pembina County

DELINEATION OF COSTS
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING AND EDUCATION
SFN 61801 (10/2021)

DWR Date Received : Month Day, Year

Project:	Tongue River NRCS Watershed Plan - Implementation
Sponsor:	Pembina County Water Resource District
Contact:	LuAnn Kemp, Secretary
Phone:	701_265_4511
Engineer:	Christi Fisher, NRCS State Conservation Engineer
Phone:	701_530_2091

Total Cost :	$ 4,777,616
Ineligible Cost :	$ 3,674,900
Eligible Cost :	$ 1,102,716
Local Cost :	$ 4,336,516

Date: October 25, 2021

	Cost-Share $
	$ 441,100
Preconstruction :	$ 162,005
Construction :	$ 1,748,642

Project Type:	Cost-share %
Recreation	40%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	0.4%	Tree Clearing & Stockpiling	2	AC	9,204.00	$ 18,408	40%	$ 7,363
2	4.4%	Temporary Diversion	8	EA	22,634.40	$ 181,075	40%	$ 72,430
3	0.9%	Stripping/Topsoiling	5857	CY	6.07	$ 35,552	40%	$ 14,221
4	3.9%	Excavation & Haul (Floodplain Pool)	67716	CY	2.40	$ 162,518	40%	$ 65,007
5	0.3%	Excavation & Haul (Existing Levees)	3138	CY	3.50	$ 10,983	40%	$ 4,393
6	7.9%	Channel Earthen Fill Placement	65665	CY	5.00	$ 328,325	40%	$ 131,330
7	2.0%	Install Channel Gravel/Cobble	16447	CY	5.00	$ 82,235	40%	$ 32,894
8	21.8%	Furnish Channel Gravel Material	18657	TONS	48.60	$ 906,730	40%	$ 362,692
9	1.8%	Furnish Boulders	924	TONS	79.00	$ 72,996	40%	$ 29,198
10	7.8%	Furnish Select Cobble Material	6678	TONS	48.60	$ 324,551	40%	$ 129,820
11	4.2%	Furnish Riprap (NDDOT Grade II)	3882	TONS	45.00	$ 174,690	40%	$ 69,876
12	3.7%	Furnish & Install Sheet Pile	2975	SF	51.34	$ 152,737	40%	$ 61,095
13	0.8%	Install Boulder Arch Ramp and Rock Sill	1	LS	32,711.85	$ 32,712	40%	$ 13,085
14	4.4%	Type I Bank Treatment (On-site Material)	2000	FT	91.00	$ 181,990	40%	$ 72,796
15	14.8%	Type I Bank Treatment (Off-site Material)	4960	FT	124.50	$ 617,531	40%	$ 247,012
16	6.3%	Construct Type II Bank Treatment	9310	FT	28.09	$ 261,499	40%	$ 104,599
17	0.1%	Construct Wood Debris Collector	3	EA	1,500.00	$ 4,500	40%	$ 1,800
18	1.9%	Furnish & Install Silt Fence	19800	FT	3.93	$ 77,814	40%	$ 31,126
19	0.1%	Vegetation Management (Mow and Spray	38.2	AC	60.44	$ 2,309	40%	$ 924
20	0.3%	Vegetation Management (Hay & Floodplai	38.2	AC	361.15	$ 13,796	40%	$ 5,518
21	1.9%	Native Riparian Seeding	27.5	AC	2,900.00	$ 79,750	40%	$ 31,900
22	0.0%	Hay Seeding	10.7	AC	190.48	$ 2,038	40%	$ 815
23	0.2%	Cordgrass Plug Planting	500	EA	20.00	$ 10,000	40%	$ 4,000
24	1.2%	Riparian Forest Planting	16.3	AC	2,976.15	$ 48,511	40%	$ 19,404
25	0.0%		0		-	$ -	40%	$ -
26	0.0%		0		-	$ -	40%	$ -
		Construction Sub-Total				$ 3,783,250	40%	$ 1,513,300
	10.0%	**Contingency**				$ 378,325	40%	$ 151,330
	87.1%	**Construction Total**				$ 4,161,575	40%	$ 1,664,630
		Preconstruction Costs						
27	9.7%	Final Design	1	NA	405,012.00	$ 405,012	40%	$ 162,005
28	0.0%		0		-	$ -	40%	$ -
29	0.0%		0		-	$ -	40%	$ -
30	0.0%		0		-	$ -	40%	$ -
31	0.0%		0		-	$ -	40%	$ -
	8.5%	**Preconstruction Total**				$ 405,012	40%	$ 162,005
		Construction Engineering Costs						
32	5.0%	Construction Contract Management	1	NA	210,029.00	$ 210,029	40%	$ 84,012
33	0.0%		0		-	$ -	40%	$ -
34	0.0%		0		-	$ -	40%	$ -
35	0.0%		0		-	$ -	40%	$ -
36	0.0%		0		-	$ -	40%	$ -
	4.4%	**Construction Engineering Total**				$ 210,029	6500736%	$ 84,012
		Other Eligible Costs						
37	0.0%		0		-	$ -	40%	$ -
38	0.0%		0		-	$ -	40%	$ -
39	0.0%		0		-	$ -	40%	$ -
40	0.0%		0		-	$ -	40%	$ -
41	0.0%		0		-	$ -	40%	$ -
	0.0%	**Other Eligible Total**				$ -	40%	$ -
		In-eligible Costs						
42	0.0%	Easement	1	LS	1,000.00	$ 1,000	0%	$ -
43	0.0%		0		-	$ -	0%	$ -
44	0.0%		0		-	$ -	0%	$ -
45	0.0%		0		-	$ -	0%	$ -
	0.0%	**Other Ineligible Total**				$ 1,000	0%	$ -
	100.0%	**Total**				$ 4,777,616		
		Eligible Total				$ 4,776,616	40%	$ 1,910,646
		Federal or State Funds That Supplant Costs				$ 3,673,900		
		Eligible Cost Total				$ 1,102,716	40%	$ 441,086

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

DWR Date Received : 10/25/21

TONGUE RIVER WATERSHED PLAN

Appendix D-1: Channel Stability Assessment

Tongue River, Looking Downstream @ Monitoring Cross Section #10

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USDA United States Department of Agriculture

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Table of Contents

Tables

Figures

1 Background

Landowners and residents of Pembina County have observed an increasing amount of channel instability in the Tongue River, between Senator Young and Renwick Dams, over the course of the last decade. Owners of river adjacent land, particularly between the 127th Ave NE bridge and the State Highway 32 bridge, have observed the destructive impacts of river channel incision and widening to their property. Loss of productive farm and forestlands, destruction of private road crossings, erosion of bridge piers, reduction in the density and longevity of natural beaver dams, and loss of natural riparian areas have been evident over the last decade. Brad and Linda Kingery, who own property upstream of the Highway 89 bridge, have been particularly active in raising awareness of these issues and soliciting assistance from a variety of sources including the Pembina Soil and Water Conservation District, Pembina Water Resource District, the North Dakota Forest Service, North Dakota State University, and the USDA-Natural Resources Conservation Service (NRCS). NRCS staff have been monitoring incision and bank erosion rates in area between the Highway 89 and 127th Ave NE bridges since 2015. After the Pembina County Water Resources District initiated the Tongue River PL-566 Watershed Plan, NRCS completed a larger scale evaluation of reach stability for the full watershed selected by the local PL-566 planning team as well. Aerial imagery from drone flights, reservoir bathymetric surveys, and hydrologic/hydraulic models completed by Houston Engineering provided data for this report as well.

Watershed History

Prior to the arrival of Europeans in North America, estimates of beaver populations range from 60-400 million (Naiman et al., 1988). Historical accounts of trappers and explorers from the 19th century detail the ubiquity of beaver across much of North America (Dolin, 2010), and a report from the Hudson Bay Company in 1783 describes the Red River Valley being full of beaver dams to the extent that the resulting marshes, mudholes, and sinkholes prevented passage (Bluemle, 2016). Beaver trapping throughout the 19th century and settlement in the late 1800s, which resulted in conversion of native tall grass prairie to cropland, generated substantial reductions in beaver populations. Beaver dams are important morphological features in river channels, which provide an abundance of benefits to river ecosystems. Specific consequences of the removal of beaver dams include decreased physical complexity and simplification of instream habitat, decreased channel-floodplain connectivity; increased peak flows and reduction in baseflow, channel incision, decreased groundwater tables and water storage, and conversion of multi-threaded channels to single threaded channels (Wohl, 2013).

Beginning in the 1880s, native prairies were plowed and converted to cultivated agricultural fields, including draining and filling pothole wetlands. Construction of access roads also resulted in improved drainage and

lowered natural retention on the landscape. By the late 1950s approximately 85% of the watershed had been converted to cropland, the result of which was increased runoff volume as the result of decreased infiltration and retention (NRCS, 2004). The Pembina Water Resource District has a long history of working with the NRCS PL-566 Watershed Program in the Tongue River; starting in 1957 10 dams were constructed in the watershed as shown in Figure 1. Construction of the dams mitigated flooding impacts on agricultural lands in the watershed by replacing increased runoff due to land use changes and lost wetlands, plus additional storage to further reduce peak flow rates.

Natural hydrologic conditions, representing pre-1880s environment, are modeled in HEC-HMS Version 4.7.1 (USACE, 2020) and compared to existing conditions; existing conditions hydrology report is included as Appendix D-2. Natural conditions include Runoff Curve Number (RCN) adjustments for land use change from cultivated agriculture to meadow, and ponding adjustments, plus removal of watershed dams. RCN adjustments due to land use changes considered approximations of wholistic watershed parameters, i.e. Hydrologic Soil Group (HSG) and land use. The predominant watershed upstream of Highway 89 HSG's are B and C as identified in Web Soil Survey (USDA, 2021). With ~85% cropland for existing conditions, the average RCN is ~70. Watershed HSG's are applied to existing and natural land uses following NRCS Hydrology guidance (USDA, 2004), which accounted for an average RCN reduction of ~5 for change from cropland to meadow. Natural wetlands comprised ~15% of the watershed, approximated by product of WSS (USDA, 2021a) hydric rating and composition of watershed; most wetlands are in headwaters subbasins. Therefore, upper subbasins RCN were reduced 40%, middle subbasins reduced 10%, and lower subbasins had no ponding area reductions, according to Table 5-2 of North Dakota Hydrology Manual (USDA, 2021b). The maximum RCN adjustment due to loss of wetlands/ponding areas is 25. Therefore, the average existing RCN is ~70, while natural is ~55. The peak flow at Highway 89 for existing and natural conditions are summarized in Table 1, which highlights the substantial storage and peak flow reduction of watershed dams, i.e. Senator Young and Olson, even considering existing conditions increased subbasin runoff.

Table 1: HEC-HMS Version 4.7.1 Modeled Peak Flow Estimates at Highway 89

	Natural	Existing	
Flood Magnitude	Flow	Flow	% Change
2-year	387	304	-27%
5-year	762	483	-58%
10-year	1,153	674	-71%
25-year	1,819	977	-86%
50-year	2,412	1,246	-94%
100-year	2,981	1,527	-95%

The combination of declining beaver populations and increased runoff over the first half of the 20th century contributed to river channelization and incision in the Tongue River watershed, just as it did throughout the Red River Basin. In addition, transportation infrastructure has served to constrain and dictate the current river alignment and levees were constructed in some locations. The Tongue River thalweg location appears to have changed considerably since the first mapping efforts, approximately 140 years ago. Figure 2 shows the 2019 extended alignment over-plotted on the 1881 Government Land Office (GLO) map (U.S. Department of the Interior, 1881).

Historical Observations

Longtime residents of the area describe the Tongue River as being a shallow, narrow channel, easily crossed most of the year without a worry of water going over a person's boots. Private farm crossings consisted of bridges with spans of 20 feet or less, in the project reach. The river bottom bridge piers on the Highway 89 bridge Unfortunately, NRCS survey records to develop hydraulic modeling for the watershed dam projects, that would have been taken in the 1950s, cannot be located for a comparison with current conditions. The oldest reliable survey data located was from the Highway 89 bridge construction project over the Tongue River in 1969. As depicted in Figure 3, a comparison of existing measurements versus the ND DOT bridge design drawings indicates

the channel has incised 4.5 feet at this location. Those drawings also depict the channel straightening that occurred in conjunction with the bridge project.

Historic aerial photos were located for most of the project reach from 1941, which was used in conjunction with quad photos for channel alignment. Fairly clear rectified orthophotography from between 1954-1962 (herein called 1962) and 1998 were obtained from International Water Institute (IWI, 2021), which were used for channel alignment of the respective years. FSA 2020 aerial orthophotography was used for the 2020 channel alignment. There is increased uncertainty of exact alignment in 1941 due to limited aerial coverage and resolution of the image, but the greater sinuosity compared to later years is apparent. Figure 4 shows those photos and a comparison of the river channel alignment over time, with resulting measurements summarized in Table 2 below.

Table 2: Historical Channel Planform Within Project Reach (Station 4+25 to 98+50)

Imagery Date	Channel Length (ft)	Sinuosity	Notes
1941	9,622	1.72	No levees
1962	9174	1.63	Levees built west of Hwy 89 with channel straightening
1998	8,219	1.47	Hwy 89 bridge built with channel straightening
2020	8,626	1.54	Regaining length from meandering due to bank erosion

Other evidence of the recent channel incision on the Tongue River are the elevations of abandoned river channel meanders both upstream and downstream of the Hwy 89 bridge, in comparison to the current channel bottom. Figure 5 shows two locations where constructed levees cut off old meanders of the river, near the Hwy 89 bridge crossing. Field survey work with RTK GPS equipment at these, and other cutoff river meanders, found a consistent elevation difference of 4-5 feet between the old river channel bed. That generally matches observations by local residents, although many use a description of 6-8 ft of channel bed lowering since the 2013 flood event. The most extreme floods recorded in this watershed were in 1950, prior to construction of watershed dams, and 2013 which activated the auxiliary spillways on a number of those dams for the first time. It is likely that flood event served to accelerate what may have been a more gradual, slow moving incision process in previous decades.

Aerial imagery also documents the expansion of sediment deposits at the outlet of the Tongue River into the Renwick Dam reservoir as a result of upstream channel erosion. Notably, the delta where larger and heavier sediments are deposited has expanded ~36 acres in size; see Figure 6 for historic extents and elevations. The Digital Raster Graphic (DRG) published in 2000 was based on data from prior decades; however, the exact timeframe is not certain as this was a large collection effort. LiDAR from 2008 matched extents from that timeframe; ground surface points were above the 972 (NGVD29) elevation that was mapped as water prior. Further Renwick sediment deposition and delta expansion details are documented in Appendix D-8.

Regional Hydraulic Geometry

Development of regional hydraulic geometry curves are key to completing geomorphological assessments of incised river channels, as well as to designing restoration projects. Multiple depositional surfaces are present in the actively incision reach of the Tongue River and identification of the bankfull channel features cannot be reliable done without a reference for stable dimensions based on drainage area. There is currently no formally published regional curve for the Red River Valley, therefore it was necessary to create one for the project utilizing procedures in NEH Part 654 (NRCS, 2007). Measurements of a typical cross section of the abandoned channel cutoff by old levees from the Tongue River, two reference reach riffle cross sections on the NB Park River, and four USGS gauge sites on nearby rivers were used to develop a calibrated regional curve, which relates drainage area to bankfull parameters. Cross sections were surveyed at six USGS gauges with long term records locations, which allowed correlation to flow and recurrence interval. Each cross section was taken at a riffle section near the gauge (but outside of the bridge influence). The location of gauges utilized for development of the regional curve is identified in Figure 7. Recorded gauge station and field data (Worksheets 2-1) are included as Figure 8-13 for each of the six sites. Overall, field data has been calibrated to gauge data for proper interpretation of bankfull level. Drainage area adopted average of documented contributing and entire drainage areas; which is based on partial drainage of closed depressions in the region. The calibrated field measurements were generally used, however width and depth from gauge analysis were used for two sites (5084000 & 5083580), where the

field data identified slightly overwidened and shallow cross section compared to gauge section and trendlines. Data is summarized in Table 3 and the resulting relationship for cross sectional area is depicted in Figures 14-16. Valley type and stream type are also listed, which are described in Figures 17-18.

Table 3: Hydraulic Geometry Measurements Utilized for Regional Curve Development

River	USGS Gauge	Valley Type	Stream Type	Drainage Area (sqmi)	Slope (ft/ft)	Bankfull Flow (cfs)	Bankfull RI (years)	Bankfull Area (sqft)	Bankfull Width (ft)	Bankfull Mean Depth (ft)
MB Forest Tributary	5083580	U-GL-GO	F/G 6	18.4	0.0008	33	1.3	23.5	18.6	1.2
MB Forest	5083600	U-GL-GO	C/E 5/6	43.2	0.0015	65	1.6	38.5	20.7	1.9
Little S Pembina	5099400	U-BR-BC	B3c	177	0.006	550	1.4	131.3	43.1	3.1
Forest	5084000	U-BR-BC	F4/5	496	0.003	610	1.6	278.3	73	3.7
Park	5090000	U-LA-LD	E6	695	0.00001	860	1.5	933.8	89.1	10.5
Pembina	5099600	U-BR-BC	C4	3350	0.0004	2800	2.0	794	124	6.4

Note that with the exception of the Little South Pembina River, all of the gauges are located in channelized reaches with altered hydrology, therefore none serve to act as reference reaches for design purposes. Therefore, the relationship of drainage area to bankfull cross sectional area is the usable result from this effort. Validation of the developed regional curve was completed by comparison with data from other studies that were likely to have some similarity to the project area, also depicted in Figures 14-16. MN DNR provided summary data for field bankfull channel measurements completed at multiple USGS and MN DNR gauge sites on the east side of the Red River Valley, some of which were within a similar hydro-physiographic province in terms of precipitation/runoff relationships elevation, lithology, and land use. Other sites from the MN dataset have higher proportions of natural lakes and/or forested areas, and do not compare as well. Data derived from a geomorphology study of the Upper Sheyenne River (Barr, 2019) was also utilized for comparison, as was national level data published in NEH Part 654 (NRCS, 2007). Results show reasonable minor differences between the developed project curves and the one from the Upper Salmon River, ID curve published in the NEH (USDA, 2007). It was the only curve in the NEH dataset near to the Tongue River in average annual precipitation; the Tongue River has a 20-24 inch range, while Upper Salmon River, ID watershed fell in a wider range of 16-28 inches (PRISM, 2015).

2 General Reach Stability Evaluation

NRCS guidance for assessing river stability focuses understanding the "difference between the dynamic nature of streams and natural adjustment processes compared to an acceleration of such adjustments" (USDA, 2007). The NRCS considers geologic setting with consideration for sediment data, hydrological flow, stage, and stress calculations, morphological dimensionless parameters to correlate similar hydro-physiographical province rivers of all sizes, and biological riparian vegetation inventory. These assessment protocols are simplified to understandable levels for relatively complex phenomenon using analog, analytical, and empirical methodologies (NRCS, 2007). An important aspect of the NRCS geomorphic stability analysis is identifying the "sources/causes of instability, and adverse consequences to physical and biological function" (NRCS, 2007). The NRCS biological assessment is based on visual aquatic and terrestrial visual elements. NRCS methods have undergone rigorous calibration, widespread validation in the public and private sector, and are well accepted among river restoration professionals. Finally, summaries and results from these methods are concise and address natural resource concerns, such as vertical and lateral instabilities causing land loss, poor water quality, sediment supply, and wildlife concerns of landowners and public in the Tongue River watershed. The following tasks were completed to analyze the stability of the 26-mile reach between Senator Young Dam and the upper extents of the Renwick Dam reservoir and are summarized through the remainder of this section.

- Split the 26 mile reach into geomorphic reaches with similar characteristics and landscapes.
- Assign each geomorphic reach valley type and fluvial landscape
- Measure river planform parameters from aerial images and LiDAR

- Field survey cross sections and calculate bankfull parameters.
- Classify stream type by reach according to Rosgen Classification System (USDA, 2007).
- Within each geomorphic reach, document stream stability indices (i.e. size and order, meander patterns, depositional patterns, etc.).
- Complete a biological assessment using the NRCS Stream Visual Assessment Protocol 2 (USDA, 2009)
- Evaluate channel stability using Pfankuch modified by Rosgen (USDA, 2007)
- Complete channel predictions for
    - Lateral stability
    - Vertical stability for excess deposition / aggradation
    - Vertical stability for channel incision / degradation
    - Channel enlargement
- Summarize channel enlargement and sediment supply

Geology, Valley Type, and Reach Designations

The reach of the Tongue River selected by the local planning team for consideration is 26 miles Renwick Dam to Senator Young Dam, which spans three valley types and fluvial landscapes. The geologic processes that formed this landscape include continental glacier expanse and retreat, as well as glacial Lake Agassiz. The controlling bedrock feature in this area is Pierre Shale, which was laid in the Cretaceous period and is very shallow in the vicinity of the Pembina Escarpment. The continental glacier and Lake Agassiz drained away ~10,000 years ago with warming global temperatures; which included massive rivers with high erosive power. Historic and recent erosion through the Tongue River valley brought the channel bottom to the controlling bedrock formation Pierre Shale. Figure 19 depicts the geologic cross section of the area, with the 26 mile "General Reach" evaluated overlaid on it. The valley types in the region include VI, IX, and X (USDA, 2007). Valley type VI are bedrock-controlled valleys, which is synonymous with U-BR-BC (Rosgen, 2014). Valley type IX includes gentle slopes associated with glacial outwash, which is synonymous with U-GL-GO; this valley is typically above and west of Pembina Escarpment. Valley type X is associated with very gentle slopes in glacio-lacustrine deposits, which is synonymous with U-LA-LD on the bed of glacial Lake Agassiz.

Reaches were designated based on valley type, bed materials, plan form, cross section, and slope as summarized in Table 4 and shown in Figure 20. The locations of representative cross sections utilized for evaluation are also shown in Figure 1. Drone imagery, photos, typical sections, and geomorphic parameters for typical cross sections are documented in detail in a standalone report (ND NRCS, 2020).

Table 4: General Stability Evaluation Reach Descriptions

Reach ID	Cross Section	Valley Type[1]	Valley Type[2]	Stream Type	River Length (mi)	Slope (ft/ft)
1	R12	VIII	C-GL-TP	E5	3.7	0.005
2	R13	VI	U-BR-BC	E4	3.5	0.004
3	R11	VI	U-BR-BC	B4c	1.4	0.005
4	14 (2-20)	VI	U-BR-BC	B4/F4	1.5	0.003
5	D (B-M)	VI	U-BR-BC	B4c	0.8	0.003
6	R1	X	U-LA-LD	F4	3.8	0.003
7	R5	X	U-LA-LD	F4	4.0	0.002
8	R4	X	U-LA-LD	F4	7.0	0.001

1. NRCS , 2007. NEH Part 654, Chapter 11 Table 11-1.
2. Rosgen, 2014. River Stability Field Guide, Chapter 1.

The middle reaches (3 through 6) had indicators of instability, while the upper (1 and 2) and lower (7 and 8) showed little indicators of instability. Indicators of instability included raw cut banks, incised channel, and generally fair to poor habitat conditions. Land use adjacent to the channel is predominately forest, with some

areas of perennial grasses, and some areas of row crops. The forest buffer is generally wider in the upper reaches and decreasing in lower reaches. The forest or perennial grass buffer in reaches 1 and 2 is ~2,000 feet, reach 3 ~1,000 feet, and then reaches 4 through 8 is ~500 feet. Certain areas, although sporadic and limited, of the lower reaches (4 through 8) have no buffer where row crops are immediately adjacent to the stream. The Tongue River is typically straightened through road crossings; the typical section is ~400 feet, although reach 6 includes extensive straightening of ~1,500 feet at Hwy 32.

Reach 1: The upstream boundary is Senator Young Dam and it extends 3.7 river miles downstream through undeveloped lands and old hayfields/pastures no longer in use. Reach 1 includes glacial deposits as it receded to the Northeast; which are identified as "stony, silty till" where "boulders are common and cobbles are abundant" (Arndt, 1975). A geologic cross section of the region shows steeper slopes, very thin glacial drift, and shale at ground surface throughout middle portion of general stability reach. Scattered large, rounded, boulders are evident in the channel bed. The reach has overall well vegetated banks with herbaceous and woody shrubs. There are occasional beaver dams in the reach. Valley width is relatively narrow, on the order of ~150 feet, and therefore is considered a Confined valley. Some channel meanders reach the valley edge, which has created steep bare cuts into the course, heterogeneous, unconsolidated glacial till terraces. Channel and floodplains are alluvial material, consisting of sand/silt and occasional bounders. Therefore, the fluvial landscape is GLacial Till Plain (C-GL-TP). There is not a valley type for C-GL-TP, so it was determined to fit best in VIII (Alluvial channel) valley type.

Reach 2: Continues downstream from Reach 1 and extends 3.5 river miles. The reach has overall well vegetated banks with herbaceous grasses upstream and hardwood forests downstream. The valley width is extending wider at this point, on the order of ~600 feet, and is therefore considered Unconfined valley. Some channel meanders reach the valley edge, which has created steep bare cuts into coarse, heterogeneous, unconsolidated glacial till terraces. The channel starts to include Pierre Shale bedrock in the lower portion of the reach where the cross section was taken. Shale bed particles are gravel size, with some fine gravels mixed in as well. Therefore, the fluvial landscape is BedRock Controlled (U-BR-BC), and the valley type is VI.

Reach 3: Continues downstream from Reach 2 and extends 1.4 river miles. At the intersection of reach 2 and reach 3 is the Campbell Scarp or Pembina Escarpment, "a wave-cut bluff that was formed during a relatively long period of time during which the lake stood at this level" (Arndt, 1975). The reach has vegetated banks with herbaceous grasses and some trees, however less than Reach 1 and 2. Valley width is staying consistent, on the order of ~600 feet, therefore considered Unconfined valley. Channel is noticeably more incised and many banks have cuts, and more than when the channel reaches the valley edge. There is a noticeable increase in raw bank length from Reach 1 and 2, which banks appear to be cuts into course, heterogeneous, unconsolidated glacial till terraces. Channel materials is still in shale bedrock, bed particles are gravel size and some gravels are present. Therefore, fluvial landscape is BedRock Controlled (U-BR-BC), and valley type is VI.

Reach 4: Continues downstream from Reach 3 and extends 1.5 river miles to Hwy 89. The reach has some vegetated banks with herbaceous grasses and some trees, however less vegetation is present than Reach 3. There was one beaver dam observed in the reach in 2018. The valley width at this point is staying consistent to widening; a width of ~600 feet is normal and wider sections are >1,000 feet, therefore it is considered Unconfined valley. The channel is noticeably more incised and many banks are eroded, particularly when the channel reaches the valley edge. There is a noticeable increase in raw bank length from Reach 3, in which banks appear to be cut into course, heterogeneous, unconsolidated glacial till terraces. Channel materials remain shale bedrock and particles are of gravel size mixed with actual gravels. Therefore, the fluvial landscape is BedRock Controlled (U-BR-BC), and the valley type is VI.

Reach 5: Continues downstream from Reach 4 and extends 0.8 river miles. The reach has some vegetated banks with herbaceous grasses and some trees, at a higher density than Reach 4. Valley width stays consistent to widening; a width of ~800 feet is normal and wider sections are >1,000 feet, therefore it is considered Unconfined valley. Channel incision stays consistent as many banks have eroded areas, particularly when the channel reaches the valley edge. There is slightly less raw bank length than in Reach 4, in which banks appear to be cuts into coarse, heterogeneous, unconsolidated glacial till terraces. Channel materials remain shale bedrock and particles

are of gravel size mixed with actual gravels. Therefore, the fluvial landscape is BedRock Controlled (U-BR-BC), and the valley type is VI.

Reach 6: Continues downstream from Reach 5 and extends 3.8 river miles. The reach has some vegetated banks with herbaceous grasses and some trees, similar to Reach 5. There are occasional beaver dams in the reach, as well as numerous trees falling in the river. This reach arrives on the glacial Lake Agassiz plane therefore, there is a noticeable change in valley type and fluvial landscape. Valley width at the upper boundary is ~1,400 feet, middle reach right bank goes on indefinitely, and lower reach has become a perched channel where the floodplain expands indefinitely. Therefore, this reach is considered Unconfined valley. Channel incision is remains consistent and many banks are eroded. There is slightly less raw bank length compared to Reach 5, and banks appear to be cut into fine, heterogeneous, unconsolidated glacial lake sediments. Channel material is predominantly gravel and shale is no longer evident. Therefore, the fluvial landscape is LAcustrian Deposition (U-LA-LD), and the valley type is X.

Reach 7: Continues downstream from Reach 6 and extends 4 river miles. The reach has some vegetated banks with herbaceous grasses and some trees, similar to Reach 6. During extreme low flow conditions, such as October 2018 when the field work was completed, there is no water present in this channel reach. The channel is perched, similar to upstream reach 6. The perched channel dissects the river bottom from the water table, causing the channel to go dry. The floodplain expands indefinitely, however raised roads cross the floodplain to direct water back to river. Therefore, this reach is considered Unconfined valley. Channel incision is lower than upstream reach 6. There are fewer raw bank lengths compared to Reach 6, and banks appear to be cuts into fine, heterogeneous, unconsolidated glacial lake sediments with a large sand component. Channel materials are gravel and shale is no longer evident. Therefore, fluvial landscape is LAcustrian Deposition (U-LA-LD), and valley type is X.

Reach 8: Continues downstream from Reach 7 and extends 7 river miles, the downstream boundary of which is the upper end of the Renwick Dam reservoir. The reach has some vegetated banks with herbaceous grasses and considerable number of trees, many trees have fallen in the river. There is a small amount of water back in the channel during low flows as the channel is no longer perched. The valley width is ~350 feet. Therefore, this reach is considered Unconfined valley. Channel incision and raw banks are similar to reach 7. Banks are mostly silt with some gravel. Channel materials are gravel, with some shale evident again. Therefore, fluvial landscape is LAcustrian Deposition (U-LA-LD), and valley type is X.

The furthest extent of glacial lake Agassiz included reaches 3 through 8. Reaches 3 through 6 include standlines or beaches of Lake Agassiz, typically including sand and gravel ridges much lower in magnitude than the scarp.

Planform Parameters

Tongue River planform parameters were measured using 2018 aerial images and LiDAR obtained in 2008 and 2009. The 2018 aerial images included National Agricultural Imagery Program (NAIP) as well as drone photos obtained by Houston Engineering Inc. in October 2018. Figure 21 summarizes critical planform and cross section parameters. Table 5 includes a summary of planform parameters. Overall, the planform parameters in these general reaches are similar to those determined for gauge stations reaches utilized for developing the regional curves. In reaches of these extended lengths, certain smaller sections may have considerably different values than the overall reach. For example, some reaches are stabilizing into an incised channel or the reduced sinuosity of a channel cutoff section may not significantly affect a several mile reach. Therefore, these values are used in conjunction with stability indices that consider bankfull parameters, visual assessments, regionalized validation relationships, and hydraulic phenomenon calculations.

Table 5: General Stability Evaluation Reach Planform Parameters Descriptions

Reach ID	Cross Section	Stream Type	River Length (mi)	Sinuosity	Radius of Curvature (ft)	Belt Width (ft)	Meander Width Ratio
1	R12	E5	3.7	1.7	85 (65-135)	190 (80-300)	9.5

2	R13	E4	3.5	1.9	90 (60-130)	140 (105-200)	6.5
3	R11	B4c	1.4	1.6	90 (50-170)	170 (110-230)	6.1
4	14 (2-20)	B4/F4	1.5	1.6	170 (65-270)	150 (110-210)	4.7
5	D (B-M)	B4c	0.8	1.7	80 (60-165)	165 (120-200)	7.6
6	R1	F4	3.8	1.7	85 (65-180)	200 (120-300)	7.3
7	R5	F4	4.0	1.8	80 (60-120)	150 (110-200)	4.7
8	R4	F4	7.0	2.5	85 (60-160)	155 (110-300)	5.0

Bankfull Channel Dimensions

The regional curve for bankfull area was utilized to identify depositional features at each representative cross section that corresponded to the bankfull elevation. The field identified bankfull elevation corresponded nearly exactly to the regional curve estimate in many locations, which the exception of Reaches 4 and 5 where a consistent depositional surface is not present. Within Reaches 4 and 5, the regional curve bankfull determination of 62.4 square feet was field verified through survey of the original river channel that had been cutoff by levees. Measurements at old riffle sections were within +/- 5%, therefore the relationship was determined valid.

Table 6: General Stability Evaluation Reach Bankfull Channel Dimensions

Reach ID	Cross Section	Stream Type	Drainage Area (sqmi)	Bankfull Area (sqft)	Bankfull Width (ft)	Bankfull Mean Depth (ft)	Width/Depth Ratio	Entrenchment Ratio
1	R12	E5	48.5	50.4	19.9	2.5	1.7	3.6
2	R13	E4	53.6	54.9	21.6	2.5	1.9	2.3
3	R11	B4c	61.4	59.3	28	2.1	1.6	1.7
4	14 (2-20)	B4/F4	62.3	62.4	34.6	2.0	1.6	1.1-1.9
5	D (B-M)	B4c	63.2	62.4	30.9	2.0	1.7	1.2-1.9
6	R1	F4	63.5	61.8	27.3	2.3	1.7	1.1
7	R5	F4	83.2	70.1	32.0	2.2	1.8	1.3
8	R4	F4	123.0	89.9	31.2	2.9	2.5	1.4

Stream Visual Assessment Protocol (SVAP) Reach Ratings

The NRCS Stream Visual Assessment Protocol Version 2 (USDA, 2009) was completed for the 8 general assessment reaches. As the name implies, the analysis is strictly based on visual assessments of each reach. There are 15 elements used to assess a stream. The elements are rated on scale from 0-10, in which 0 is very poor and 10 is excellent. Biological indicators dominate the assessment of channel condition, hydrological alterations, riparian area conditions, and fish habitat complexity. First, a channel evolution model is used to determine current state of channel, which includes stable, incising, widening, or stabilizing. These evolution designations are used to help score other elements. SVAP2 scores are documented in Table 7.

Table 7: Stream Visual Assessment Protocol Version 2 Ratings

		General Reach SVAP2 Rating							
Element Number	Element Description	1	2	3	4	5	6	7	8

CEM	Channel Evolution Model	I	IV	IV	III	III	III	IV	IV
1	Channel Condition	8	6	8	2	4	4	6	6
2	Hydrologic Alteration	4	4	4	4	4	4	4	4
3	Bank Condition	8	7	5	1	3	5	8	9
4	Riparian Area Quantity	8	8	8	6	7	5	8	10
5	Riparian Area Quality	8	8	7	5	5	6	8	8
6	Canopy Cover	2	2	2	2	2	2	7	10
7	Water Appearance	4	4	4	4	4	4	4	4
8	Nutrient Enrichment	6	6	6	6	6	6	6	6
9	Manure or Human Waste	10	10	10	10	10	10	10	10
10	Pools	8	5	4	4	4	7	4	4
11	Barriers to Movement	10	10	10	10	10	10	10	10
12	Fish Habitat Complexity	8	4	5	4	4	5	2	5
13	Aquatic Invertebrate Habitat	7	3	5	4	6	5	2	7
14	Aquatic Invertebrate Community	5	5	5	4	5	5	2	5
15	Riffle Embeddedness	10	10	8	8	8	10	10	10
Sum		106	92	91	74	82	88	91	108
Overall		7.1	6.1	6.1	4.9	5.5	5.9	6.1	7.2
Rating		Good	Fair	Fair	Poor	Fair	Fair	Fair	Good

In summary, the most upstream and downstream reaches (Reach 1 & 8) were in good condition, while others were all considered fair. The good ratings make sense with overall impression of reaches 1 and 8. However, values in the fair range did not discriminate between reaches that had significantly more unstable banks at the lower end of the fair range which is likely due to very similar biological criteria, i.e. canopy, habitat, invasive species, and etc. SVAP assessment is simply a very preliminary evaluation tool and requires further stability analysis to provide adequate weight to significant raw banks, over widened channel, and depositional features.

Watershed Assessment of River Stability and Sediments Supply (WARSSS) Reach Stability Indices

Stream stability indices were documented during cross-section surveys in 2018. Stability indices use a departure analysis of morphological and specific channel variables. These indices are considered Level III and follow worksheets 3-2 through 3-9 and 3-15 from Watershed Assessment of River Stability and Sediment Supply (WARSSS) (Rosgen, 2009) and River Stability Field Guide (Rosgen, 2014). Table 8 includes a summary of general reach stability indices ratings.

Table 8: WARSSS Reach Stability Index Ratings

		General Reach Stability Indices							
Indices	Worksheet	1	2	3	4	5	6	7	8

Flow Regime	3-2	P-7	P-7	P-7	P-7	P-7	P-7	I-7	P-7
Size & Order	3-3	S-4	S-4	S-4	S-4	S-4	S-4	S-5	S-5
Meander Patterns	3-4	M3	M3	M5	M5	M5	M5	M5	M2
Depositional Patterns	3-5	B1	B1	B2	B5	B3	B2	B2	B2
Channel Blockages	3-6	D7	D2	D4	D4/D7	D3	D8	D3	D4
Degree of Channel Incision	3-7	1.23 (Slightly Incised)	1.46 (Moderately Incised)	1.31 (Moderately Incised)	2.30 (Deeply Incised)	2.96 (Deeply Incised)	3.23 (Deeply Incised)	3.22 (Deeply Incised)	5.14 (Deeply Incised)
Width.Depth Ratio State	3-8	0.7 (Stable)	0.6 (Stable)	0.94 (Stable)	1.63 (Highly Unstable)	0.89 (Stable)	0.56 (Stable)	0.68 (Stable)	0.50 (Stable)
Degree of Confinement	3-9	0.7 (Little or No Departure)	0.9 (Little or No Departure)	0.9 (Slight Departure)	0.7 (Slight Departure)	1.1 (Little or No Departure)	1.1 (Little or No Departure)	0.7 (Slight Departure)	0.76 (Slight Departure)
Stream Succession Stage Shifts	3-15	At potential (Stable)	At Potential (Stable)	High W/D (Moderately Unstable)	C - F (Unstable)	C - F (Unstable)	C - F (Unstable)	C - F (Unstable)	C - F (Unstable)

Pfankuch Channel Stability Reach Ratings

The Pfankuch stability rating used is a recent update "Pfankuch (1975) channel stability rating procedure, as modified by Rosgen" (Rosgen, 2014). This is summarized in worksheet 3-10 of the River Stability Field Guide (Rosgen, 2014). Field stability prediction parameters were measured in October 2018 for each of the eight general stability reaches. The ratings are categorized by cross section upper banks, lower banks, and bottom. There are 15 keys/categories, of which four to six are applied at each cross section location. Each key is scored for the eight reaches. Each key rating has a variable range depending the influence on total stability prediction. The lowest range is 1-4, and highest is 6-24; from excellent to poor respectively. The rating is based on scoring from variables and potential stream type. Table 9 includes a summary of Pfankuch channel stability rating modified by Rosgen.

Table 9: Pfankuch Stability Ratings

General Reach Pfankuch Ratings									
Location	Key	1	2	3	4	5	6	7	8
Upper Banks	1	6	8	8	8	8	8	8	8
	2	9	6	9	9	9	9	6	6
	3	2	2	6	6	6	4	6	6
	4	6	3	9	12	6	7	6	9
Lower Banks	5	3	4	3	4	4	4	4	4
	6	8	8	8	16	8	8	8	8
	7	4	2	4	6	4	4	4	6
	8	6	12	16	16	16	16	12	12
	9	4	4	8	16	12	12	8	8
Bottom	10	2	2	2	3	2	2	2	2
	11	2	2	2	2	2	2	2	2
	12	6	6	6	8	6	6	6	4
	13	8	8	8	8	8	12	8	8
	14	12	12	12	12	12	18	12	12
	15	2	2	2	2	3	3	2	2
	Total	80	81	103	128	106	115	94	97
Existing Type		E5	B4c	B4c	B4c	B4c	F4	F4	F4
*Potential Type		C4	C4	C4	C4	C4	C4	C4	C4

	Rating	Good (Stable)	Good (Stable)	Fair (Mod. Unstable)	Poor (Unstable)	Fair (Mod. Unstable)	Poor (Unstable)	Fair (Mod. Unstable)	Fair (Mod. Unstable)

Channel Stability Predictions for Lateral/Vertical Enlargement or Deposition

Channel stability predictions are based on prior report sections indices and ratings. The computer program RiverMorph V 5.2.0 (Wildland Hydrology, 2018) was used to calculate sediment competence based on bankfull parameters and channel slope. The River Stability Field Guide (Rosgen, 2014) separates the predictions into lateral stability (Workseheet 3-16 in Table 10), vertical stability for excess deposition/aggradation (Worksheet 3-17 in Table 11), and vertical stability for channel incision/degradation (Worksheet 3-18 in Table 12).

Table 10: General Reach Lateral Stability Prediction (Worksheet 3-16)

	General Reach (with Representative XS) Rating							
Criteria/ Worksheet	1 (R12)	2 (R13)	3 (R11)	4 (10)	5 (I/R2)	6 (R1)	7 (R5)	8 (R4)
1 (W3-8)	0.7	0.6	0.9	1.6	0.9	0.6	0.7	0.5
2 (W3-5)	B1	B1	B2	B5	B3	B2	B2	B2
3 (W3-4)	M3	M3	M5	M5	M5	M5	M5	M2
4 (W3-13)	Appears stable	Appears stable	Interpolate between 4 & 5	0.2	0.015	See Reach 5	See Reach 5	See Reach 5
5 (W3-9)	0.7	0.9	0.9	0.7	1.1	1.1	0.7	0.8
	Lateral Stability Points by General Reach (Worksheet 3-16)							
Criteria	1	2	3	4	5	6	7	8
1	2	2	2	8	8	2	2	2
2	1	1	1	4	3	1	1	1
3	1	1	3	3	3	3	3	3
4	2	2	6	8	4	4	4	4
5	2	1	1	2	1	1	2	2
Total	8	7	13	25	19	11	12	12
	Stable	Stable	Unstable	Highly Unstable	Unstable	Moderately Unstable	Moderately Unstable	Moderately Unstable

These results match field observations and measurements of laterally highly unstable in reach 4, then becoming more stable in upstream and downstream reaches. Table 4, high width and width/depth ratio in the middle reaches alluded to these unstable results.

Table 11: General Reach Vertical Stability Prediction for Excess Deposition/Aggradation (Worksheet 3-17)

	General Reach (with Representative XS) Rating							
Criteria/ Worksheet	1 (R12)	2 (R13)	3 (R11)	4 (10)	5 (I/R2)	6 (R1)	7 (R5)	8 (R4)
1 (W3-14)	105	98	101	57	72	63	56	39
2 (Powersed)	Powersed not run due to lack of bankful sediment data, assumed same as criteria #1							
3 (W3-8)	0.7	0.6	0.94	1.6	0.9	0.6	0.681	0.5
4 (3-15)	At potential	At Potential	High W/D	C - F	C - F	C - F	C - F	C - F
5 (W3-5)	B1	B1	B2	B5	B3	B2	B2	B2

6 (W3-6)	D7	D2	D4	D4/D7	D3	D8	D3	D4
	Vertical Stability for Excess Deposition/Aggradation Points by General Reach (Worksheet 3-17)							
Criteria	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2
3	2	2	2	8	8	2	2	2
4	2	2	6	6	6	6	6	6
5	1	1	2	3	3	2	2	2
Total	2	1	2	2	1	3	1	2
Total	11	10	16	23	22	17	15	16
	No Deposition	No Deposition	Moderate Deposition	Excess Deposition	Excess Deposition	Moderate Deposition	Moderate Deposition	Moderate Deposition

These results match field observations and measurements of deposition in reaches 4 and 5, and less deposition in upstream and downstream reaches. Noteworthy depositional patterns include diagonal and numerous mid-channel bars in reach 4, numerous mid-channel bars in reach 5, and point bars with few mid-channel bars in reaches 3, 6, 7, and 8.

Table 12: General Reach Vertical Stability Prediction for Excess Deposition/Aggradation (Worksheet 3-18)

	General Reach (with Representative XS) Rating							
Criteria/ Worksheet	1 (R12)	2 (R13)	3 (R11)	4 (10)	5 (I/R2)	6 (R1)	7 (R5)	8 (R4)
1 (W3-14)	105	98	101	57	72	63	56	39
2 (Powersed)	Powersed not run due to lack of bankful sediment data, assumed same as criteria #1							
3 (W3-7)	1.23	1.46	1.31	2.30	2.96	3.23	3.22	5.14
4 (3-15& 3-7)	All BHR >1.1 and W/d >5							
5 (W3-9)	0.7	0.9	0.9	0.7	1.1	1.1	0.7	0.76
	Vertical Stability for Channel Incision/Degradation Points by General Reach (Worksheet 3-18)							
Criteria	1	2	3	4	5	6	7	8
1	4	8	8	6	6	6	4	2
2	4	6	8	6	6	6	4	2
3	4	6	4	8	8	8	8	8
4	4	4	4	4	4	4	4	4
5	2	1	1	2	1	1	2	2
Total	18	25	25	26	25	25	22	18
	Slightly Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Slightly Incised

These results may not appear to match observed incision conditions. However, this prediction is actually measuring ongoing incision, or headcutting, prior to widening. Headcutting is rapid process that often occurs during flood events. The past 5 years have not had significant flood flows, therefore the recent processes include widening or stabilizing, as SVAP2 CEM identified for reaches 2-8; reach 1 was considered stable. The scores are noteworthy given that they again identify the middle reaches as having the most risk for further channel incision. The lack of "Degradation" (worst score) make sense as there were no observations of gullies or headcutting. "Moderately Incised" results for most reaches accurately represents historic incision, current widening or stabilizing, and future potential for further incision during flood events.

Summary of Channel Enlargement and Sediment Supply

Channel enlargement (Worksheet 3-19 in Table 13) and sediment supply (Worksheet 3-20 in Table 14) predictions summarize prior stability indices and predictions to address the purpose and need of the watershed planning effort. The goals identified by the planning team were to reducing flooding impacts and improve channel stability, therefore these results help to quantitatively prioritize which reaches should receive primary focus.

Table 13: General Reach Vertical Stability Prediction for Channel Enlargement (Worksheet 3-19)

	General Reach (with Representative XS) Rating							
Criteria/ Worksheet	1 (R12)	2 (R13)	3 (R11)	4 (10)	5 (I/R2)	6 (R1)	7 (R5)	8 (R4)
1 (W3-15)	At potential	At Potential	High W/D	C - F	C - F	C - F	C - F	C - F
2 (W3-16)	Stable	Stable	Unstable	Highly Unstable	Unstable	Moderate Unstable	Moderate Unstable	Moderate Unstable
3 (W3-17)	No Depositin	No Deposition	Moderate Deposition	Excess Deposition	Excess Deposition	Moderate Deposition	Moderate Deposition	Moderate Depositin
4 (W3-18)	Slightly Incised	Moderate Incised	Moderately Incised	Moderate Incised	Moderate Incised	Moderate Incised	Moderate Incised	Slightly Incised
	Channel Enlargement Points by General Reach (Worksheet 3-19)							
Criteria	1	2	3	4	5	6	7	8
1	2	2	4	8	8	8	8	8
2	2	2	4	8	6	4	4	4
3	2	2	4	6	6	4	4	4
4	4	6	6	6	6	6	6	4
Total	10	12	18	28	26	22	22	20
	No Increase	Slight Increase	Moderate Increase	Extensive	Extensive	Moderate Increase	Moderate Increase	Moderate Increase

This quantitative analysis matches observations, which is that most channel enlargement and sediment supply is coming from reaches 4 and 5. The "Extensive" prediction for the middle reaches is a critical finding to consider in the watershed planning process, involving loss of floodplains and farmland due to channel enlargement.

Table 14: General Reach Sediment Supply Prediction (Worksheet 3-20)

	General Reach (with Representative XS) Rating							
Criteria/ Worksheet	1 (R12)	2 (R13)	3 (R11)	4 (10)	5 (I/R2)	6 (R1)	7 (R5)	8 (R4)
1	Stable	Stable	Unstable	Highly Unstable	Unstable	Moderately Unstable	Moderately Unstable	Moderately Unstable
2	No Deposition	No Deposition	Moderate Deposition	Excess Deposition	Excess Deposition	Moderate Deposition	Moderate Deposition	Moderate Deposition
3	Slightly Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Moderately Incised	Slightly Incised
4	No Increase	Slight Increase	Moderate Increase	Extensive	Extensive	Moderate Increase	Moderate Increase	Moderate Increase
5	80	81	103	128	106	115	94	97

	Fair (Mod. Unstable)	Fair (Mod. Unstable)	Poor (Unstable)	Poor (Unstable)	Fair (Mod. Unstable)	Poor (Unstable)	Fair (Mod. Unstable)	Fair (Mod. Unstable)
	Sediment Supply Points by General Reach (Worksheet 3-20)							
Criteria	1	2	3	4	5	6	7	8
1	1	1	3	4	3	2	2	2
2	1	1	2	3	3	2	2	2
3	2	4	3	3	3	3	3	3
4	1	2	3	4	4	3	3	3
5	2	2	4	4	4	2	1	1
Total	7	10	15	18	17	12	11	11
	Moderate	Moderate	High	Very High	Very High	High	High	High

This quantitative analysis matches observations and correlates with enlargement, as sediment supply corelates strongly with enlargement. The "Very High" prediction for the middle reaches is a critical finding to address scope of watershed planning criteria of reducing flood damages given that maintaining reservoir storage is a key consideration.

Channel Evolution

As described previously, the Tongue River has reaches with ongoing severe incision and channel widening. NEH Part 654 and the Watershed Assessment of River Stability and Sediment Supply (WARSSS) (Rosgen, 2009) identify similar patterns of recognized channel evolution processes which assist in recognizing past, current, and future changes to expect. One predominant model used to describe channel incision processes is the Simon Channel Evolution Model (CEM); under which Reaches 1 and 2 would be considered Class I, Reach 3 a Class II, Reach 4 a Class III/IV, Reach 5-7 a Class V. Note that these are general descriptions of processes within the overall reach and may not apply to every individual site within the reach.

Commonly recognized channel evolution scenarios, utilizing the more detailed geomorphic classification system, are also outlined in NEH Part 654 as shown below in Figure 22. Based on reach scale measurements, the Tongue River appears to be undergoing a channel evolution process of C → G → F → Bc in Reaches 3-8. The natural channel was a C, and general reaches are currently in an F or Bc classification.

3 Detailed Evaluation, Unstable River Reaches

The general reach stability analysis identified reaches 4 and 5 as the most unstable, therefore those reaches were further analyzed for annual sediment erosion. This stability analysis is considered Level III and IV of Watershed Assessment of River Stability and Sediment Supply (WARSSS) (Rosgen, 2006) and River Stability Field Guide (Rosgen, 2014). The process used was as follows:

- Complete Level I analysis, including selection of representative reach, reference reach, and identifying valley types.
- Complete Level II analysis for understanding of existing condition geometry, dimensionless geometry, flow, and velocity. These analyses are an important inventory of the project reach valley type, geomorphology, and characterization, which will be used in stability analyses.
- Split the most unstable reaches into sections with similar annual erosion quantities
- Within each section, survey and re-survey in subsequent years cross sections and document erosion risk indices (Rosgen, 2014)
    - Bank Erosion Hazard Index (BEHI)
    - Near Bank Stress (NBS)
- Estimate annual erosion quantities from each bank and summarize for reaches.

- Estimate annual erosion quantities from each bed section and summarize for reaches.
- Analyze historical confluence between Tongue River and Renwick Dam Reservoir, notably deposition of sediment delta. Estimate annual average deposition within the delta; validate erosion estimates from project and general reaches. If the prediction and estimate don't match, adjust prediction indices in a calibration effort.

Selection of Reaches for Analysis and Valley Type (Level I)

The representative reach for stability analysis is 8,626 feet as measured from 2020 aerial imagery, which was described in Section 1 and also called "Project Reach". Repetitive field data has been collected through this whole reach between 2015 and 2020. The reference reach chosen is along the Middle Branch Forest River, which is identified on Figure 7 and described in detail in Appendix D-4.

An important part of Level I analysis is identifying the valley type, otherwise called fluvial landscape. The three most common valley types in the region include VI, IX, and X (USDA, 2007). Valley type VI are bedrock-controlled valleys, which is synonymous with U-BR-BC (Rosgen, 2014). The controlling bedrock feature in this area is Pierre Shale, which was laid in Cretaceous period and very shallow in the vicinity of the Pembina Escarpment. Valley type IX include gentle slopes associated with glacial outwash, which is synonymous with U-GL-GO; this valley is typically above and west of Pembina Escarpment. Valley type X is associated with very gentle slopes in glacio-lacustrine deposits. The historic vast lake was called Lake Aggasiz, which is below and east of the Pembina Escarpment. The Tongue River project reach, reference reach, and USGS gauge sites studied are identified on geologic maps (Bluemle, 2016) that identify basic geology and landforms in figures 23-24.

Field Data Collection (Level II)

There are no USGS gages in the general reach to give context to flow events in this time period, however there is a gage at the outlet of Renwick Dam that provides some context for annual high flow events. Table 15 is a summary of recent peak annul flows at the gauge, however due to the upstream retention the computed return intervals are not representative of the river flows upstream of Renwick dam. Based on analysis of Bourbanis and Olson Dams, which both activated in the 2013 event, that return interval was less than a 100-year event but more than a 20-year event. These records include a large drainage area, however are still appropriate to indicate that there were some larger historic floods, but no events during the 2015-2019 period that NRCS has been doing monitoring work.

Table 15: Recent Flow Events, USGS #51011000

Year	Peak Flow (cfs)	Return Interval (years)
2009	1,150	11.1
2010	462	2.9
2011	507	3.3
2012	139	1.2
2013	1,550	20.0
2014	241	1.7
2015	209	1.4
2016	323	2.2
2017	552	3.3
2018	140	1.2
2019	271	1.8
2020	333	2.2

Since there are no gauge results to provide frequency flow rates, hydrology (HEC-HMS) and hydraulic (HEC-RAS) models were developed to provide this analysis and summarized in Existing Conditions Hydraulics and Hydrology Report in Appendix D-2. Flood event peak flow rates entering the project reach are summarized in table 16. For

the purpose of final design and future monitoring, a temporary gauge was installed in the fall of 2020 at the 127th Ave NE bridge.

Table 16: HEC-HMS 4-Day Modeled Flows Through Project Reach

Return Period (Years)	Flows (cfs)
2-Year	304
5-Year	483
10-Year	674
25-Year	977
50-Year	1,246
100-Year	1,527

The project reach includes 33 cross sections, longitudinal profile, pebble counts, bar samples, and planform geometry measurements. Cross section D in general reach 5 (just downstream of Hwy 89) was used as the most representative riffle section in the project reach, which computation (Worksheet 2-2) and classification (Worksheet 2-3) details are presented in Figure 25. Critical cross section parameter descriptions are listed in Figure 21. The average bankfull flow estimate, based on average of five methods, is 271 cfs, which is plotted on regional curve in Figure 25. This value aligns with larger rivers (greater than 50 mi^2 catchments), which have measured velocities greater than 2 feet/second, similar to aforementioned hydraulic model of Tongue River. The smaller rivers (less than 50 mi^2 catchments) had measured velocities less than 2 feet/second, resulting in lower flow trendline. Bankfull flow estimate of 271 cfs associates well with typical 1-2 year return interval from table 15.

Field Data Collection (Level III)

Input data for predicting erosion included bankfull and planform parameters summarized in Tables 4 and 5, plus Figure 25. Other erosion index parameters collected in the field (i.e. root depth, root density, bank angles, surface protection, and bank materials) are also included in the calculations. Field data for measuring erosion included 31 cross sections (2-20 and B-M) surveyed annually by NRCS with an automatic level and tape at a one foot horizontal spacing, as well as measurements at bed and bank pins for minor and more precise erosion. Section endpoints are staked in the field, and surveyed into the project datum and USGS vertical benchmarks with RTK GPS. Figure 27 shows the locations of all monitoring cross sections, pebble counts, bar sieves, bed, and bank pins. Cross section and sediment sizes were collected for the purpose of erosion predictions related to incipient motion, friction, relative roughness, and shear stresses, while bed and bank pins were collected for calibration.

Riverbank Erosion Analysis

The process integration model, BANCS (Bank Assessment for Non-point source Consequences of Sediment) was used to estimate bank erosion in reaches 4 and 5 (Rosgen, 2006). The two reaches are separated into sections with expected and historic bank erosion, that have consistent erodibility parameters for the bank length. There are 63 sections within general reaches 4 and 5 that have bank erosion evident and expected in the future without the project. These 63 sections are lumped into five representative bank cross sections, which include surveyed cross sections R2-left, R2-right, 16-left, 16-right, and R3-right. Bank Height is assumed from the cross section, which is representative of the reaches.

Bank erodibility field measurements are converted to a BEHI (Bank Erosion Hazard Index), and energy distribution measurements to NBS (Near-Bank Stress). Calibration of predicted-to-observed values is completed for the streambank erosion model. BEHI is calculated from bankfull parameters, bank height, angle, vegetation, and bank soil materials. NBS methods #2 and #5 were employed, which used general prediction and detailed

predictions respectively. Method #2 uses ratio of radius of curvature to bankfull width to identify high stresses. Method #5 uses ratio of near-bank depth to bankfull depth to identify high bank stresses. The Yellowstone Erosion Rate Curve (1989) assumption was made based on geologic sediments and calibration of field cross section erosion rates. The Yellowstone curve calibrated much better for this North Dakota river than the other available curves (i.e. Colorado or North Carolina). Even though the Yellowstone curve was developed a considerable distance away, the bank sediments have similar properties to the Tongue River, and calibration was very strong. Therefore, the Yellowstone curve is applicable to use in this analysis. No bank material adjustment was made due to loamy material; web soil survey identified the soil sand/silt/clay ratios as 36/38/25%, respectively. Calibration of bank erosion rates was completed at cross sections 10, 14, 16, 18, 19, and 20. Bank pins were used at cross sections 16 and 18, which needed higher precision for low NBS and relatively low bank erosion; the measured average was 0.13 feet/year, with range of 0.1 to 0.16 feet/year.

The five representative bank cross sections were applied to 63 banks with similar characteristics. Two bank sections had very similar results, inlcluding High BEHI and Low NBS; therefore were lumped together. These four erosion rates are identified at 63 eroding banks within the project affected area on Table 17 and Figure 27. The sections are color coded with highest erosion rate in red and lowest in green; the legend includes annual erosion per linear foot. Finally, a summary of total without project effected bank erosion, which includes multiplication of bank lengths to determine erosion volume/ weight is summarized in Table 17. The bank erosion summary is 3,689 tons/year from this 2.3 mile river reach.

Table 17: General Reach Sediment Supply Prediction (Worksheet 3-20)

Station	BEHI Rating	NBS Rating	Bank Erosion Rate (ft/yr)	Length of Bank (ft)	Erosion Subtotal (cft/yr)	Erosion Rate (tons/yr/ft)
R2L	Moderate	Moderate	0.282	714	826	0.056
R2R	Moderate	Very Low	0.100	290	131	0.022
16L	Extreme	High	1.828	1482	61,158	0.704
16R	High	Low	0.529	2192	6,957	0.153
R3R	High	Low	0.529	2192	7,537	0.166

Utilizing the figures above, apportioned as shown in Figure 27, yields the following estimates:

- Total erosion (volume) = 76,608 cubic feet per year
- Total erosion (weight) = 3,689 tons per year
- Average erosion rate = 0.307 tons per year per foot

Riverbed Erosion Analysis

The analysis indicated general reaches 4 & 5 were “Moderately incised”. However, as discussed previously, the current river channel has incised 4-5 feet since 1969. Annual monitoring over the past 5 years has shown small changes in bed elevation; there has been mixed degradation and aggradation, typically less than 1 foot of change either way. Some cross sections have exhibited continued channel widening. These observations fit with channel evolution scenarios described previously; the Tongue River has been in a widening or stabilizing state the past 5 years. Most of the incision, or downcutting, likely occurred in the 2009 and 2013 flood years. Incision can be identified by an incision “wedge” on a river profile plot as occurring where the elevation difference between Bankfull (BKF) and Low Bank Height (LBH) is high in the lower reach and reduces in the in upstream direction. Due to low slope of Tongue River, the incision wedge extends for miles as shown in Figure 29. There is no classic vertical “headcut” feature present, however the zone of it’s progression is apparent in the profile view of the project reach shown in Figure 30. The stream slope upstream of the project reach ranges from 0.27 to 0.29% depending on source of background data. Historic aerial image photography between 2016 and 2020, and LiDAR collected in 2016 have different levels precision and effect of large trees on alignment lengths, which has caused slope variability within 0.2% between different aerial image photography and LiDAR.

Sediment entrainment and competence calculations were made for the project reach, which indicated stability for most cross sections during annual high flows Existing conditions for the reach, which include bankfull

parameters, bed and bar particle parameters, and river slope, were used in calculations of critical shear stress and entrainment of largest particle. The analysis found bankfull mean depths are similar to the required depth to entrain largest particle using Shields curve, and are summarized in figure 31 (Worksheet 3-14). The Shields curve is identified on figure 32. Note that this analysis is for bankfull flows, and does not describe the high potential for entrainment and further incision during future flood events. If the reach is not stabilized, incision will continue to move upstream on the trend described in figure 29 and 30 with each significant flood event.

Analysis of bed pins was completed between 2017 and 2019, in order to evaluate general bedform trends in the reach. Bed pins were installed in 2017 at cross sections 12, 16, 17, 18, and 20. Changes in 2018 and 2019 are documented in figure 33. Even though flood events are thought to have been less than bankfull in 2018 and 2019, the river is showing overall slight degradation. Future flood events in the range of 2009 and 2013 would likely have severe bed incision results, however the river channel does maintain a healthy dynamic of bedload transport. Overall, the recent trend has been 0.2 to 0.5 feet of degradation in the past 2 years. Assuming 0.3 feet of incision, a 10-foot bed width, and 2.3 miles; reach 4 and 5 would degrade ~36,400 ft^3/yr or 1,755 ton/yr.

Additional information on the context of sediment generated within these unstable reaches, within the full Tongue River watershed, as well as reservoir deposition measurements are described in Appendix D-8.

4 Contributing Factors to Recent Channel Incision

As outlined in previous sections, reach 4 and reach 5 have incised since the late 1950s, the majority of which likely took place since 2009. These are the most unstable reaches and have the highest potential for additional channel enlargement and sediment supply in the short term, and if incision continues will be a driver for additional upstream incision. There are several contributing factors driving channel instability, which include geologic, geomorphic, anthropogenic, and higher frequency of peak flows in recent decades.

Geologic, Geomorphic Factors

The primary geologic instability driver in reach 4 and 5 is the very weak Pierre Shale bedrock comprising the bed and lower banks. The historic channel was most likely within the shale layer, as local well driller logs identify the shale above even the abandoned oxbows, representing historic channel bottom. The Pierre Shale formation is described as “highly fractures and jointed”, “slump easily when exposed”, “blocky, hard, siliceous grey”, and “considered highly permeable” (Arndt, 1975). During field visits, the shale was noticeably easily weathered and broke apart along horizontal planes as well as longitudinal planes. Point bars and riffles in the channel currently contain majority shale particles being transported as bedload through the reach but do have a small component of rounded gravel. Without the massive erosion occurring in the reach, it is likely that there was a higher component of fine gravel particles in the stable channel (which is visible in portions of the more stable channel upstream, including the tributary to Olson Dam). The shale channel bed does not appear to be the driver for instabilities, however it does likely contribute to high rates of channel incision due to weak soil strength properties.

Anthropogenic Factors

Critical anthropogenic changes since the 1950s that are likely to have influenced channel incision include PL-566 watershed dams constructed by Pembina WRD/NRCS, levees constructed in reach 4, and design of the road fill and bridge for the Highway 89 crossing. Public comments through the watershed planning process have also questioned whether the expansion of tile drainage on cropland west of the Pembina Escarpment could be a contributing factor as well.

A major factor was the construction of a 1,000 ft levee along the north riverbank, upstream of the Hwy 89 bridge that cutoff ~600 feet of river channel. The 1941 aerial photo does not show that a levee is present, and the channel length was 2,600 feet (Figure 4). The 1962 aerial photo does show a levee, and straightened river centerline (Figure 4), which indicates the levee was constructed sometime between 1941 and 1962. The slope in this reach went from ~0.0031 to 0.004, which is significant and definitely would have acted to initiate channel

incision in response to the over steepened slope and the fact that the levee disconnected the majority of the floodplain (a terrace abuts the river on the south side). Levee construction was undoubtably done to increase the size of the crop fields adjacent to the river, and likely had short term benefits for the intended purpose, but long-term negative consequences to the Tongue River and floodplain complex. Many features are overgrown and barely visible, however LiDAR can still show these remnant features (Figure 5). There are 15 cutoff channels in reach 4 and 5 that are apparent with LiDAR, representing relatively recent channel changes. Most of the cutoffs in reach 4 are due to levees, while reach 5 has no apparent levees but channels were cutoff immediately downstream of Hwy 89 where flow is funneled downstream with no floodplain relief.

Channel cutoffs increase thalweg slope, which increases velocity and stress on channel bed and banks. Levees block flows above bankfull from expanding into the floodplain, which also increase channel flow, velocity, and stress on bed and banks. The most severe instabilities throughout the 26-mile reach are where channels were cutoff and levees constructed. The lack of a floodplain and sinuous channel created an extreme incision and enlargement cycle, where the levees ended up breached and the channel incised, lowering the local groundwater table which had previously sub-irrigated the adjacent cropland. Eventually, in 1994, these tracts were entered into conservation easements as the river eroded away portions of the levee during flood events.

The 1969 construction of the Hwy 89 lowered channel thalweg ~2.1 feet from existing level (figure 4). The channel was diverted and straightened from is natural alignment that meandered to the south. This new channel was widened to 76 feet, which is about double prior bridge dimension. This 1969 channel is about double the natural bankfull width and depth, which was to account for flood flows, however overwidening and deepening is also a major factor causing channel incision and disconnected floodplain. Road fill was also included across the river valley, which sits 8-12 ft above the adjacent floodplain, further acted to remove floodplain function and increase stream power in the main channel. A secondary channel on the north side of the floodplain is apparent on the quad map, which was also cutoff by the road fill across the valley. On a positive note, the bridge opening is quite wide (76 ft) in comparison to the bankfull channel width (29 ft); had it been narrower the impacts likely would have been even greater; note that the Air Force assisted in funding this oddly large bridge given it is the access to the Cavalier Air Station.

The Tongue River watershed has nine dams above Renwick reservoir, as shown in Figure 1, including Senator Young and Olson Dams upstream of Reach 4 and 5. These dams principal spillways were originally designed, accounting for storage, to not initiate auxiliary spillway flow at or below the 0.01% (100-year) rainfall event although current analysis methods indicate that objective was not achieved; both are undergoing Watershed Rehabilitation Planning currently. Dams can have many effects on channel stability, including sediment regime, water quality, and flow magnitude, duration, and timing. The first critical factor for instability can come from low suspended sediment load at dam outflow, which may create erosion to balance sediment supply with flow competence. The second instability factor is critical flow based on erosive rates due to storage of flood hydrograph with prolonged duration release flows. Both of those could be contributing the incision in the project reach, however the fact that the channel is stable upstream indicates this is likely not the main driver.

Another recent factor that may have contributed, again for the purpose of expanding and improving the productivity of cropland, has been widespread subsurface drainage installation. Throughout the Red River Basin, subsurface drainage has dramatically increased from 2000 to the present (e.g., in North Dakota, 1.26, 114, and 892 km^2 for 2002, 2008, and 2016, respectively; Finocchiaro, 2014, 2016; Dollinger et al., 2013). Recent studies have found that subsurface drainage expansion is likely the major driver of increased streamflow in 21 Minnesota agricultural watersheds (Kelly et al., 2017). Given the retention available behind dams in the Tongue River watershed, however, this does not appear to be a likely significant factor in the ongoing incision process.

Hydrologic Factors

The Tongue River, as well as the whole Red River Valley, has experienced higher flows for the same frequency meteorological event over the past 25 years. Extreme precipitation and snowfall events have increased in intensity as well as frequency, with a noticeable shift starting in 1997. Many wetlands in the watershed have been drained, in the adjoining basin "By 1975 over half of these wetlands had been drained. The severity of flooding problems have now been compounded in the lower basin (Government Accounting Office, 1979)". The Tongue

River basin most likely has had similar wetland losses, with similar compounded flooding problems in lower basins.

The more stable reaches (1, 2, 3, 6, 7, and 8) still have some slight, moderate, or high ratings. There does not appear to be levees, which has kept them less than the very high ratings. However, the elevated instabilities are likely due to road crossings, dams, variable buffer widths, geology, geomorphology, higher flows, and very unstable reaches just upstream or downstream with extensive or starved sediment supplies.

5 References

Arndt, B.M. (1975). Geology of Cavalier and Pembina Counties: North Dakota Geol. Survey Bull. 62, pt. I, and North Dakota Water Comm. County Ground Water Studies 20, pt. I, 68 p.

Barr Engineering Co. (2019). Upper Sheyenne River Corridor Erosion and Sedimentation Risk Assessment, Upper Sheyenne River Joint Water Resource Board, February 2019

Bluemle, J.P. (2016). North Dakota's Geologic Legacy, our Land and How it was Formed, North Dakota State University Press

Carlson, E.A. (2009). Fluvial Riparian Classification for National Forests in the Western United States. Fort Collins, CO: Thesis, Colorado State University

Dolin, E.J. (2010). Fur, Fortune, and Empire: The Epic History of the Fur Trade in America. W.W. Norton & Company, New York, 442pp

Dollinger, D., Lundeen, B., Stroom, K., Anderson, P., Monson, B., Nelson, S., Parson, K., Butzer, A., & Streitz, A., (2013). Bois de Sioux River watershed monitoring and assessment report, Minnesota Pollution Control Agency, St. Paul, MN

Finocchiaro, R.G. (2014). Agricultural subsurface drainage tile locations by permits in South Dakota. U.S. Geological Survey data release. Doi:https://doi.org/10.5066/F7KS6PNW

Finocchiaro, R.G. (2016). Agricultural subsurface drainage tile locations by permits in North Dakota. U.S. Geological Survey data release. Doi:https://doi.org/10.5066/F7QF8QZW

International Water Institute (2021). Map Portal (iwinst.org)

Kelly, S.A., Takbiri, Z., Belmont, P., & Foufoula-Georgiou, E. (2017). Human amplified changes in precipitation-runoff patterns in large river basins of the Midwestern United States. *Hydrology and Earth System Sciences*, 21(10), 5065– 5088. https://doi.org/10.5194/hess-21-5065-2017

Montgomery, D. R. (2002), Valley formation by fluvial and glacial erosion, *Geology*, 30, 1047– 1050

Naiman, R.J., Johnston, C.A. and Kelley, J.C., (1998). Alteration of North American Streams by Beaver. BioScience 38(11): 753-762

North Dakota State Highway Department (1969). Tongue River Bridge Layout, Project A-AD-9(3)

PRISM Climate Group, Oregon State University (2015). http://prism.oregonstate.edu.

Rosgen, D.L. & Silvey, H.L. (2006). Watershed Assessment of River Stability and Sediment Supply (WARSSS). Fort Collins, CO: Wildland Hydrology Books

Rosgen, D.L (2010). A Geomorphological Approach to Restoration of Incised Rivers. *Proceedings of the Conference on Management of Landscapes Disturbed by Channel Incision.* Univ. of Mississippi

Rosgen, D.L. & Silvey, H.L. (2014). River Stability Forms & Worksheets. Fort Collins, CO: Wildland Hydrology Books

USACE, HEC. (2020). Hydrologic Modeling System (HEC-HMS) Version 4.7.1. December 2020

USDA, SCS (1954). Work Plan, Tongue River Watershed of the Red River of the North Watershed; Cavalier and Pembina Counties

USDA, NRCS. (2004). National Engineering Handbook Part 630 Hydrology

USDA, NRCS. (2007). National Engineering Handbook Part 654 Stream Restoration Design

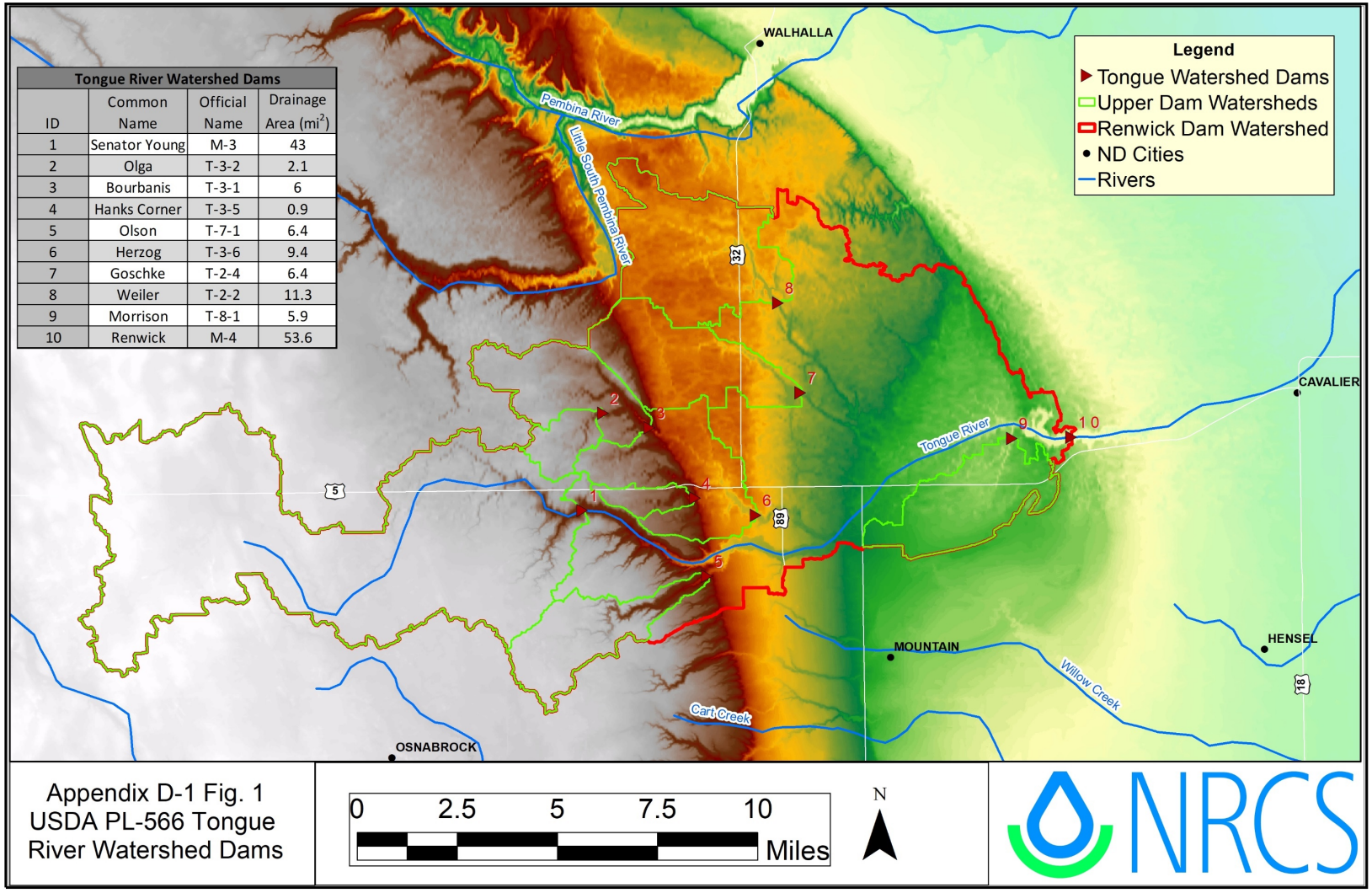
USDA, NRCS. (2009). National Biology Handbook Part 614, Subpart B; Aquatic and Terrestrial Habitat Resources

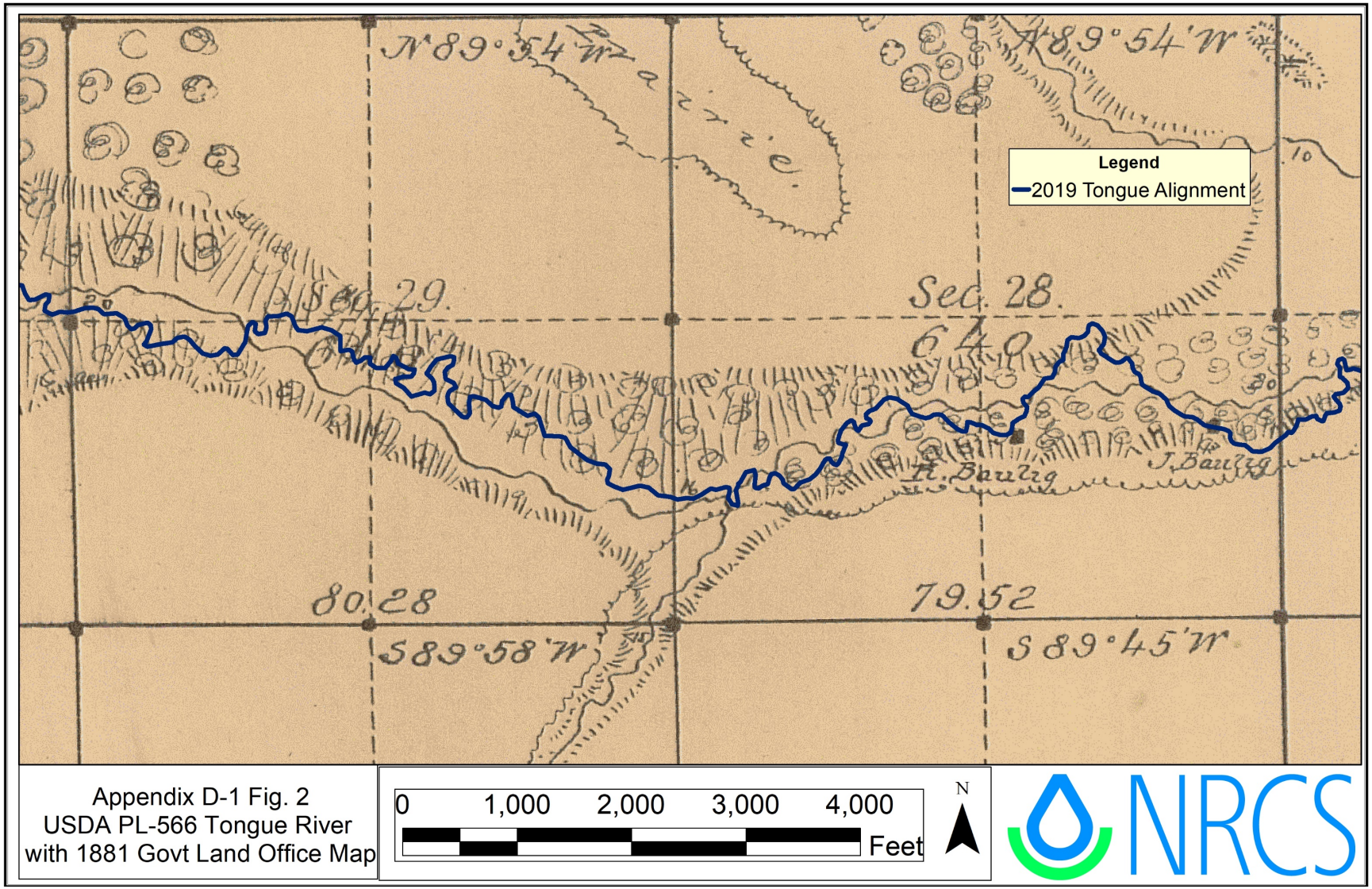
USDA, NRCS. (2021a). Web Soil Survey, accessed at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

USDA, NRCS. (2021a). North Dakota Hydrology Manual, accessed at www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/technical/engineering/?cid=stelprdb1269592

U.S. Department of Interior, BLM-GLO. (1881). Government Survey Plat Map for T161-R56, dated 4/30/1881, accessed from https://survey.swc.nd.gov/ on 10/18/2019

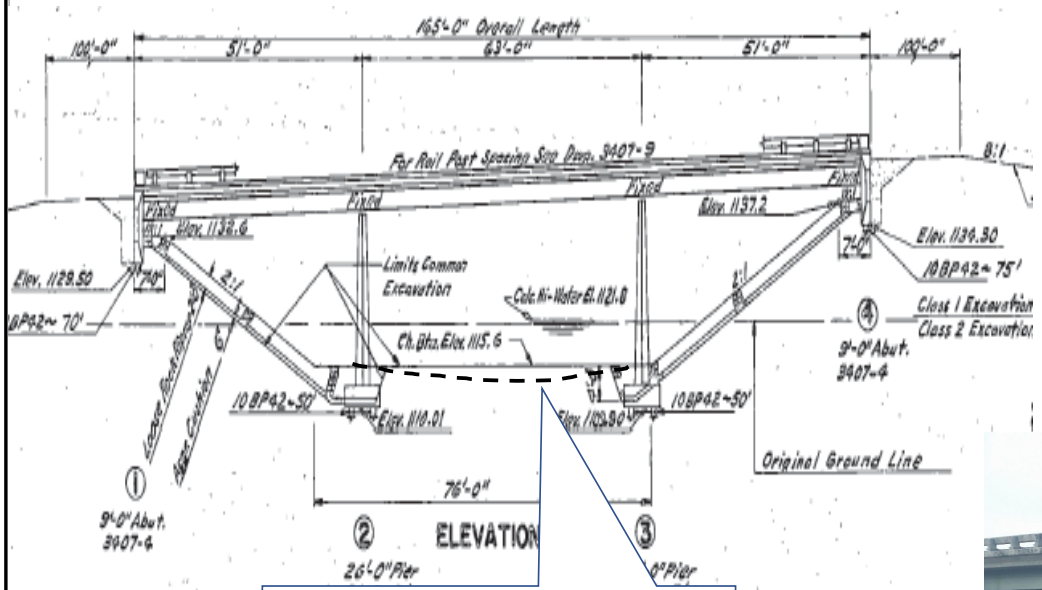
Figures


Tongue River Watershed Dams
ID | Common Name | Official Name | Drainage Area (mi²)
1 | Senator Young | M-3 | 43
2 | Olga | T-3-2 | 2.1
3 | Bourbanis | T-3-1 | 6
4 | Hanks Corner | T-3-5 | 0.9
5 | Olson | T-7-1 | 6.4
6 | Herzog | T-3-6 | 9.4
7 | Goschke | T-2-4 | 6.4
8 | Weiler | T-2-2 | 11.3
9 | Morrison | T-8-1 | 5.9
10 | Renwick | M-4 | 53.6
Legend
Tongue Watershed Dams
Upper Dam Watersheds
Renwick Dam Watershed
ND Cities
Rivers
WALHALLA
Pembina River
Little South Pembina River
CAVALIER
Tongue River
MOUNTAIN
HENSEL
Willow Creek
Cart Creek
OSNABROCK
32
5
89
18
Appendix D-1 Fig. 1
USDA PL-566 Tongue
River Watershed Dams
0 2.5 5 7.5 10
Miles
N
NRCS

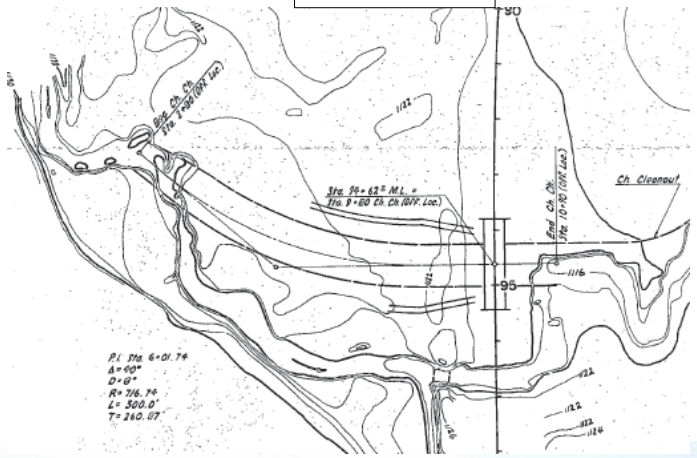


Appendix D-1 Fig. 2
USDA PL-566 Tongue River
with 1881 Govt Land Office Map

Cross Section



Plan View



Thalweg Changes (NGVD29):

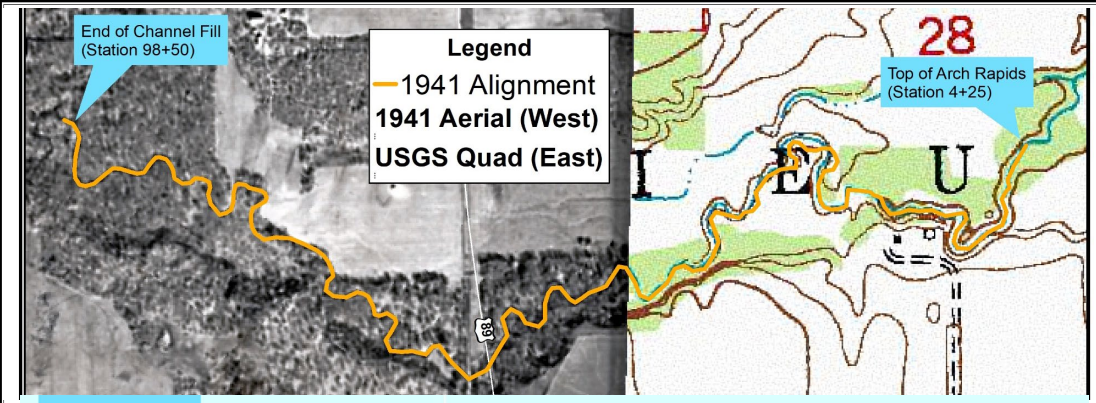
Pre – 1969 thalweg: ~1117.7

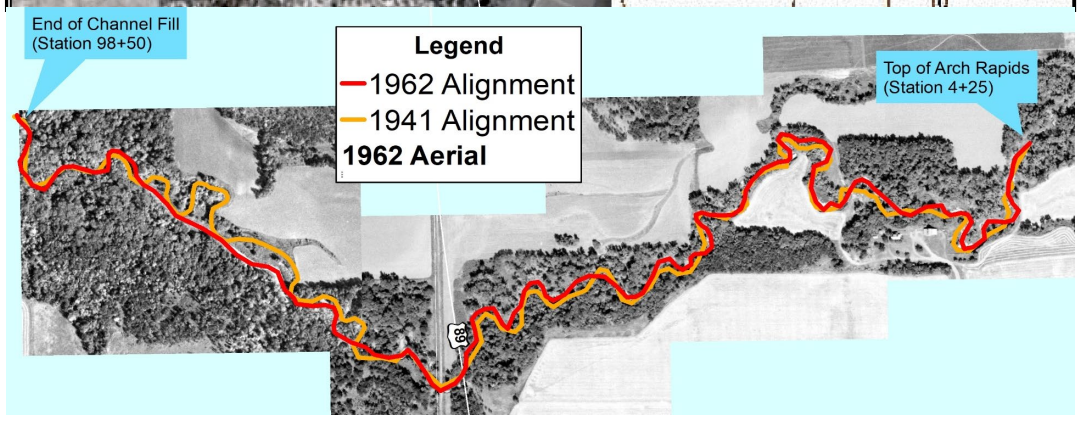
Post - 1969 thalweg : 1115.6

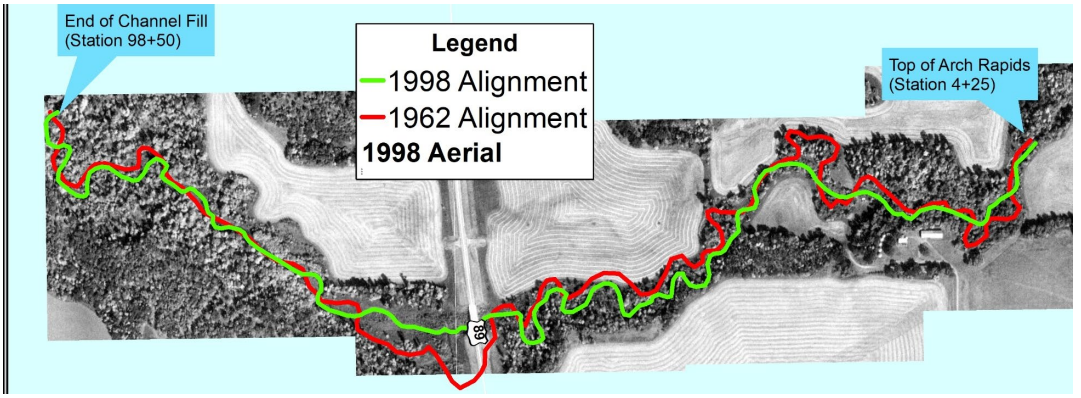
2018 thalweg: 1112.4

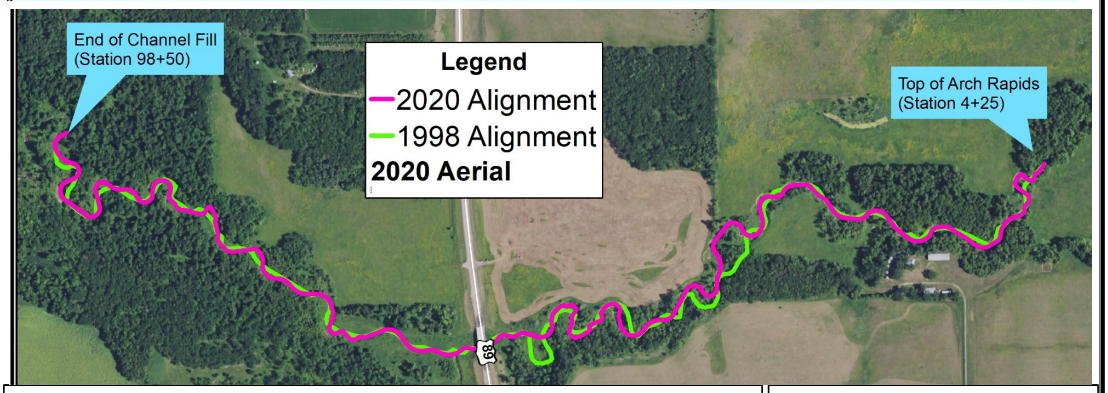
Appendix D-1 Fig. 3 Highway 89 Tongue River 1969 Bridge Plan Details, Survey, and Photo.

NRCS



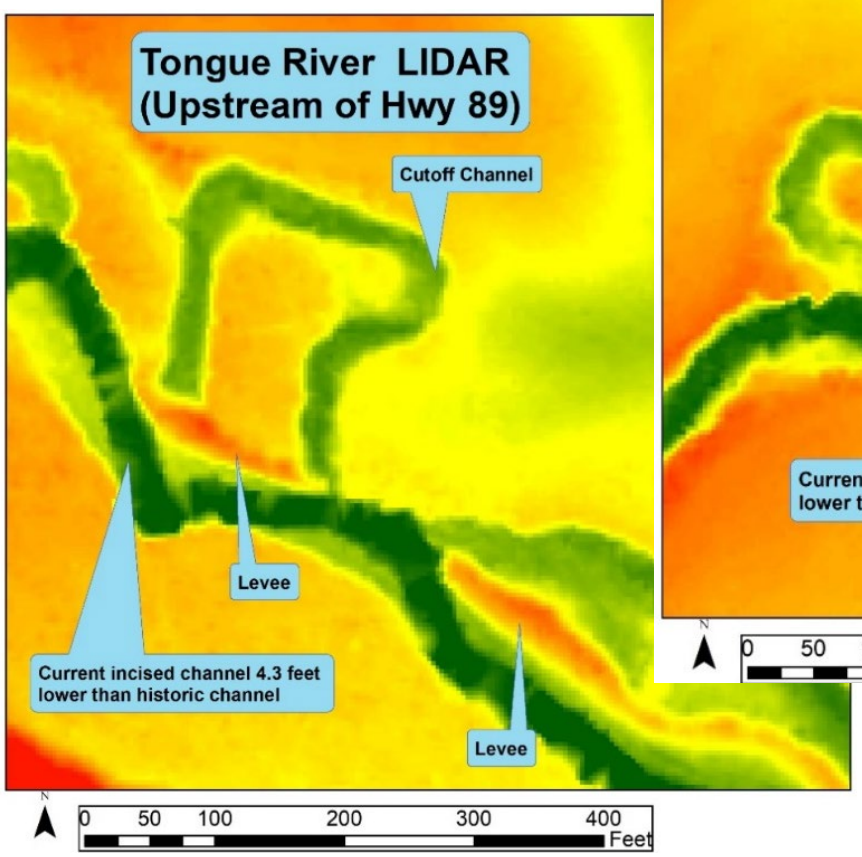


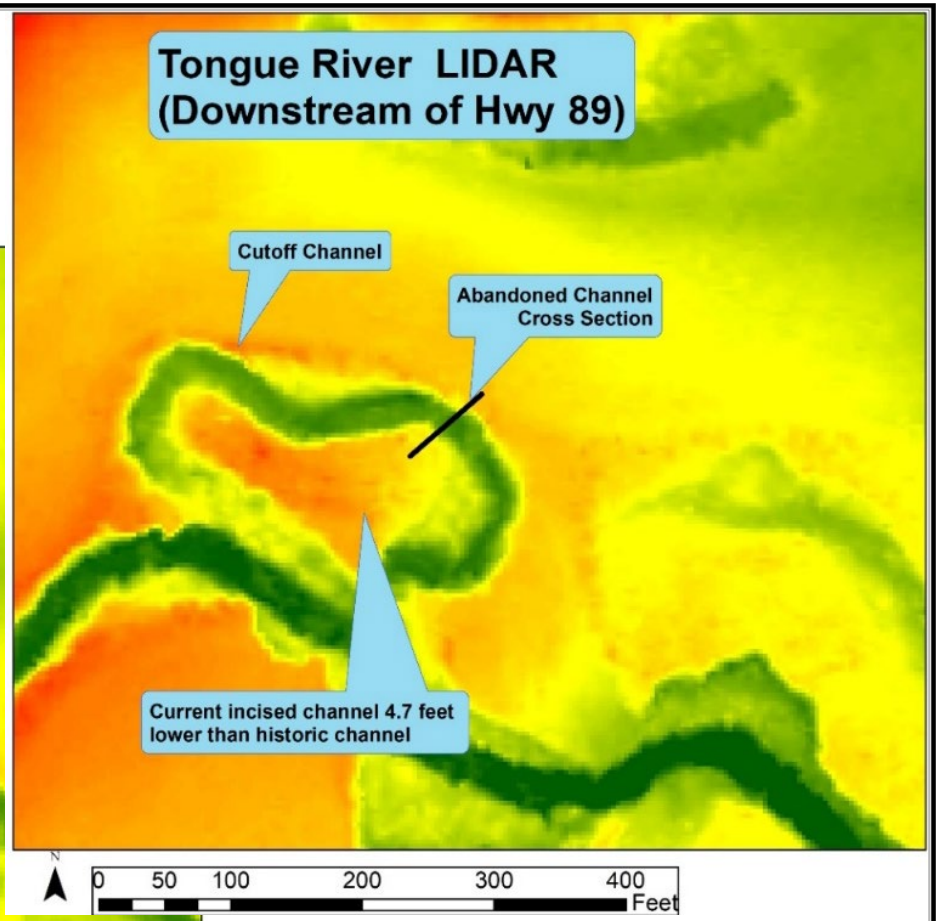




Appendix D-1 Fig. 4 Project Reach Historic River Alignments with Aerial Photos

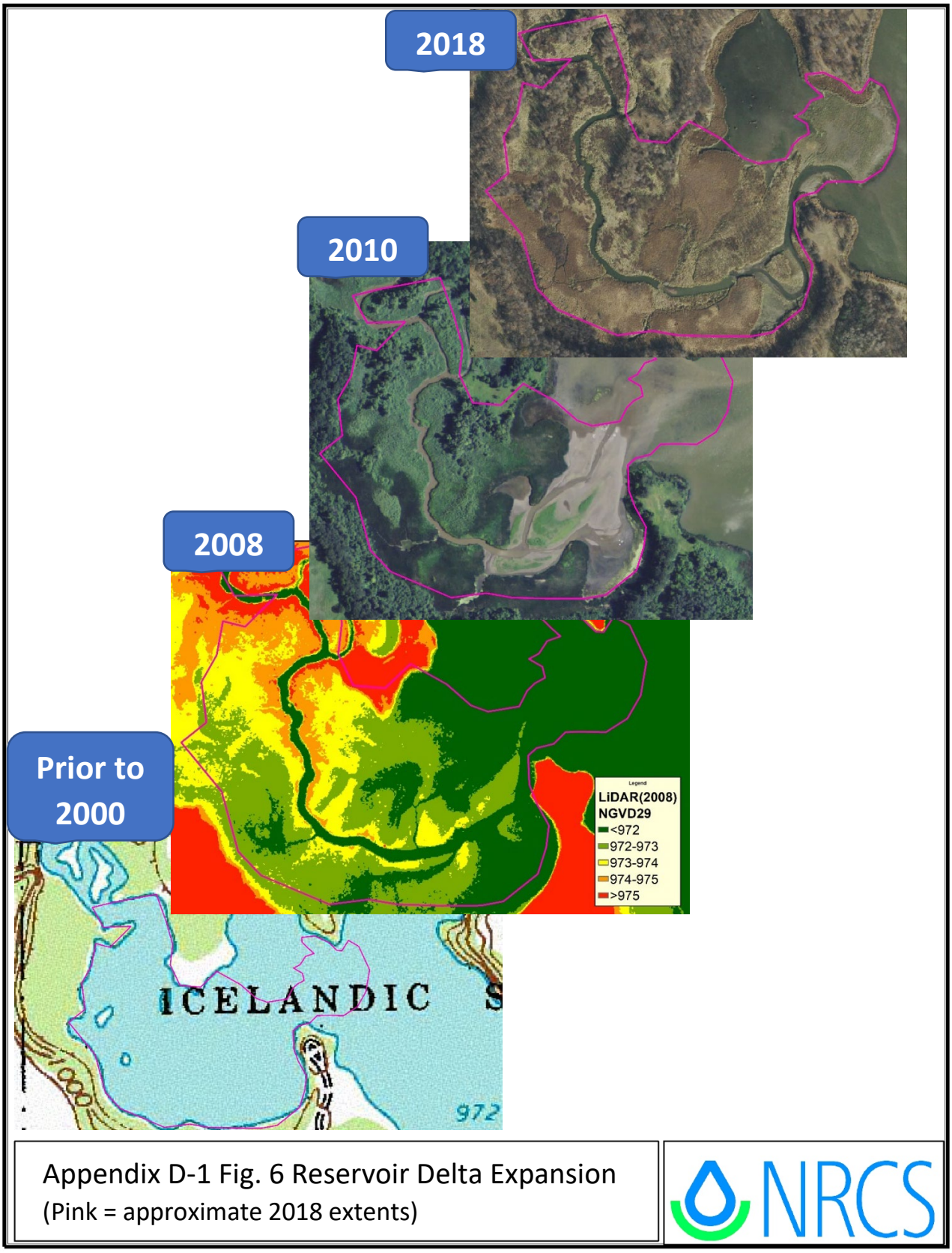
NRCS



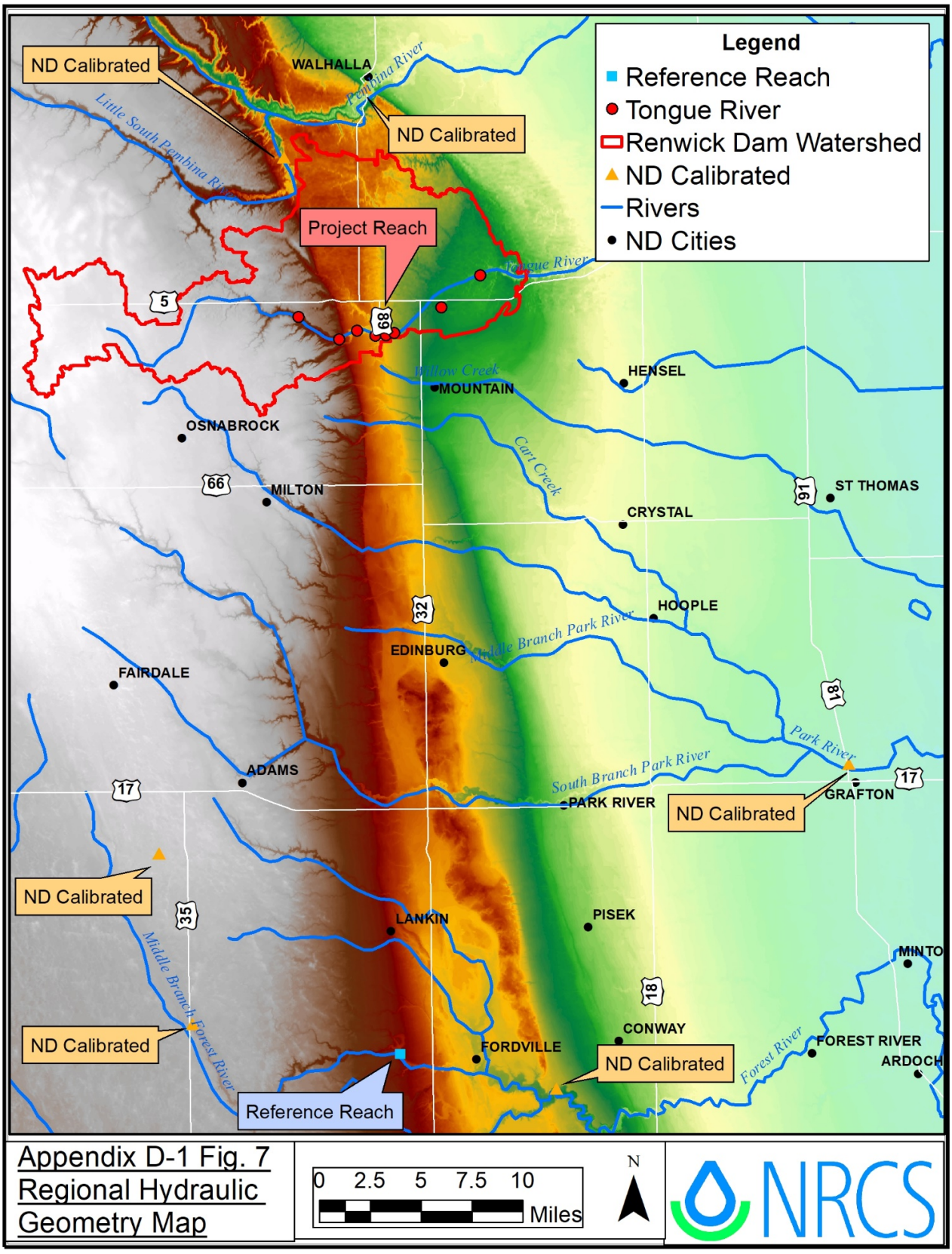


Appendix D-1 Fig. 5 Tongue River Historical Meander Cutoff by Levees near Hwy 89

NRCS



Appendix D-1 Fig. 6 Reservoir Delta Expansion
(Pink = approximate 2018 extents)


Legend
Reference Reach
Tongue River
Renwick Dam Watershed
ND Calibrated
Rivers
ND Cities
ND Calibrated
ND Calibrated
Project Reach
ND Calibrated
ND Calibrated
ND Calibrated
Reference Reach
WALHALLA
Pembina River
Little South Pembina River
Tongue River
Willow Creek
MOUNTAIN
HENSEL
OSNABROCK
MILTON
Cart Creek
ST THOMAS
CRYSTAL
HOOPLE
Middle Branch Park River
EDINBURG
FAIRDALE
Park River
South Branch Park River
ADAMS
PARK RIVER
GRAFTON
LANKIN
PISEK
MINTO
Middle Branch Forest River
CONWAY
FORDVILLE
FOREST RIVER
ARDOCH
Forest River
5
68
66
32
91
81
17
35
18
Appendix D-1 Fig. 7
Regional Hydraulic
Geometry Map
0 2.5 5 7.5 10
Miles
N
NRCS

Summary of USGS Gage Station Data

Station Name:	**Middle Branch Forest River Trib Nr Adam**				Station Number:	**5090000**	
Station Location:	**Walsh Co. 48d22'10", 98d09'00"**				Period of Record:	**12**	yrs
Drainage Area (DA):		acres	**18.4**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**F6**	Landscape Type:		**U-GL-GO**	Mean Annual Disch.:		cfs
Reference Reach Slope:		**0.00080**	ft/ft		HUC:	09 02 03 08 _ _ _ _ _ _ _ _ _ _ _ _	

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**40.6**	ft	Bankfull Width (W_{bkf})	**18.6**	ft
Bankfull Mean Depth (d_{bkf})	**0.60**	ft	Bankfull Mean Depth (d_{bkf})	**1.20**	ft
Bankfull XS Area (A_{bkf})	**23.50**	ft^2	Bankfull XS Area (A_{bkf})	**22.00**	ft^2
Wetted Perimeter (W_p)	**41.0**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)		ft	Bankfull Stage (Gage Ht.)		ft
Est. Mean Velocity ($\bar{u}$)	**1.40**	ft/sec	Mean Velocity ($\bar{u}$)	**1.40**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**32.9**	cfs	Bankfull Discharge (Q_{bkf})	**30.8**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**33.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**1.20**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**50.0**	cfs	**10** Year **R.I.** Discharge =	**390.0**	cfs
2.0 Year **R.I.** Discharge =	**66.0**	cfs	**25** Year **R.I.** Discharge =	**450.0**	cfs
5.0 Year **R.I.** Discharge =	**235.0**	cfs	**50** Year **R.I.** Discharge =	**450.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)	**230-560**	ft	Belt Width (W_{blt})	**125-225**	ft/ft

HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

		Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient	(a)	**3.9**	**0.4**	**1.6**	**0.6**
Slope Exponent	(b)	**0.5**	**0.3**	**0.8**	**0.2**

Hydraulic Radius: $R = A / W_p$	**0.57**	ft	Manning's *'n'* at Bankfull Stage	**0.021**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

Appendix D-1 Fig. 8 USGS Gauge and Field Measurement Calibration (MB Forest Trib)

Summary of USGS Gage Station Data

Station Name:	**MB Forest River NR Whitman, ND**				Station Number:	**583600**	
Station Location:	**Walsh Co. 48d14'50" 98d07'00"**				Period of Record:	**30**	yrs
Drainage Area (DA):		acres	**38.7/47.7**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**C5/6**	Landscape Type:	**U-GL-GO**		Mean Annual Disch.:	**3**	cfs
Reference Reach Slope:	**0.0015**	ft/ft	HUC:	09 02 03 08 _ _ _ _ _ _ _ _ _ _ _ _			

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**20.7**	ft	Bankfull Width (W_{bkf})	**27.0**	ft
Bankfull Mean Depth (d_{bkf})	**1.90**	ft	Bankfull Mean Depth (d_{bkf})	**1.60**	ft
Bankfull XS Area (A_{bkf})	**38.50**	ft^2	Bankfull XS Area (A_{bkf})	**40.00**	ft^2
Wetted Perimeter (W_p)	**40.5**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)		ft	Bankfull Stage (Gage Ht.)		ft
Est. Mean Velocity ($\bar{u}$)	**1.60**	ft/sec	Mean Velocity ($\bar{u}$)	**1.60**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**61.6**	cfs	Bankfull Discharge (Q_{bkf})	**64.0**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**65.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**1.70**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**56.0**	cfs	**10** Year **R.I.** Discharge =	**635.0**	cfs
2.0 Year **R.I.** Discharge =	**80.0**	cfs	**25** Year **R.I.** Discharge =	**888.0**	cfs
5.0 Year **R.I.** Discharge =	**389.0**	cfs	**50** Year **R.I.** Discharge =	**984.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)	**60-200**	ft	Belt Width (W_{blt})	**70-170**	ft/ft

HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

		Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient	(a)	**3.9**	**0.4**	**1.6**	**0.6**
Slope Exponent	(b)	**0.5**	**0.3**	**0.8**	**0.2**

Hydraulic Radius: $R = A / W_p$	**0.95**	ft	Manning's *'n'* at Bankfull Stage	**0.048**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

Appendix D-1 Fig. 9 USGS Gauge and Field Measurement Calibration (MB Forest River)

Summary of USGS Gage Station Data

Station Name:	**Little South Pembina River Nr Walhalla, N**			Station Number:	**5099400**		
Station Location:	**Cavalier County, 48d51'55" 98d00'20"**			Period of Record:	**65**	yrs	
Drainage Area (DA):		acres	**172/182**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**B3C**	Landscape Type:	**VI, U-BR-BC**		Mean Annual Disch.:	**29**	cfs
Reference Reach Slope:	**0.0060**	ft/ft	HUC:	09 02 03 16 _ _ _ _ _ _ _ _ _ _ _ _			

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**43.1**	ft	Bankfull Width (W_{bkf})	**45.0**	ft
Bankfull Mean Depth (d_{bkf})	**3.05**	ft	Bankfull Mean Depth (d_{bkf})	**3.00**	ft
Bankfull XS Area (A_{bkf})	**131.30**	ft^2	Bankfull XS Area (A_{bkf})	**150.00**	ft^2
Wetted Perimeter (W_p)	**45.3**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)	**1117.06**	ft	Bankfull Stage (Gage Ht.)	**1117.00**	ft
Est. Mean Velocity ($\bar{u}$)	**3.90**	ft/sec	Mean Velocity ($\bar{u}$)	**3.90**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**512.1**	cfs	Bankfull Discharge (Q_{bkf})	**585.0**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**550.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**1.40**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**655.0**	cfs	**10** Year **R.I.** Discharge =	**5212.0**	cfs
2.0 Year **R.I.** Discharge =	**1189.0**	cfs	**25** Year **R.I.** Discharge =	**8395.0**	cfs
5.0 Year **R.I.** Discharge =	**3236.0**	cfs	**50** Year **R.I.** Discharge =	**11220.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)		ft	Belt Width (W_{blt})	**100-500**	ft/ft

HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

		Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient	(a)	**7.0**	**0.3**	**2.4**	**0.4**
Slope Exponent	(b)	**0.3**	**0.3**	**0.7**	**0.3**

Hydraulic Radius: $R = A / W_p$	**2.90**	ft	Manning's *'n'* at Bankfull Stage	**0.059**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

Appendix D-1 Fig. 10 USGS Gauge and Field Measurement Calibration (Little S Pembina R)

Summary of USGS Gage Station Data

Station Name:	**Forest River NR Fordville, ND**				Station Number:	**5084000**	
Station Location:	**Walsh Co. 48d11'50", 97d43'49"**				Period of Record:	**81**	yrs
Drainage Area (DA):		acres	**336/456**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**F4/5**	Landscape Type:	**U-BR-BC**		Mean Annual Disch.:	**49**	cfs
Reference Reach Slope:	**0.0010**	ft/ft	HUC:	09 02 03 08 _ _ _ _ _ _ _ _ _ _ _ _			

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**90.7**	ft	Bankfull Width (W_{bkf})	**72.7**	ft
Bankfull Mean Depth (d_{bkf})	**3.07**	ft	Bankfull Mean Depth (d_{bkf})	**3.70**	ft
Bankfull XS Area (A_{bkf})	**278.30**	ft^2	Bankfull XS Area (A_{bkf})	**273.00**	ft^2
Wetted Perimeter (W_p)	**94.4**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)		ft	Bankfull Stage (Gage Ht.)		ft
Est. Mean Velocity ($\bar{u}$)	**2.20**	ft/sec	Mean Velocity ($\bar{u}$)	**2.20**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**612.3**	cfs	Bankfull Discharge (Q_{bkf})	**600.6**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**610.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**1.60**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**477.0**	cfs	**10** Year **R.I.** Discharge =	**4909.0**	cfs
2.0 Year **R.I.** Discharge =	**871.0**	cfs	**25** Year **R.I.** Discharge =	**9247.0**	cfs
5.0 Year **R.I.** Discharge =	**2710.0**	cfs	**50** Year **R.I.** Discharge =	**13932.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)	**100-180**	ft	Belt Width (W_{blt})	**140-200**	ft/ft

HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

	Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient (a)	**15.8**	**0.3**	**4.3**	**0.2**
Slope Exponent (b)	**0.2**	**0.4**	**0.6**	**0.4**

Hydraulic Radius: $R = A / W_p$	**2.95**	ft	Manning's *'n'* at Bankfull Stage	**0.044**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

Appendix D-1 Fig. 11 USGS Gauge and Field Measurement Calibration (Forest River)

NRCS

Summary of USGS Gage Station Data

Station Name:	**Park River at Grafton, ND**				Station Number:	**5090000**	
Station Location:	**Walsh Co. 48d25'29", 97d24'42"**				Period of Record:	**89**	yrs
Drainage Area (DA):		acres	**695**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**E6**	Landscape Type:		**U-LA-LD**	Mean Annual Disch.:	**74**	cfs
Reference Reach Slope:		**0.00001**	ft/ft	HUC:	09 02 03 10 _ _ _ _ _ _ _ _ _ _ _ _		

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**89.1**	ft	Bankfull Width (W_{bkf})	**124.0**	ft
Bankfull Mean Depth (d_{bkf})	**10.50**	ft	Bankfull Mean Depth (d_{bkf})	**7.50**	ft
Bankfull XS Area (A_{bkf})	**933.80**	ft^2	Bankfull XS Area (A_{bkf})	**939.00**	ft^2
Wetted Perimeter (W_p)	**100.2**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)		ft	Bankfull Stage (Gage Ht.)		ft
Est. Mean Velocity ($\bar{u}$)	**0.92**	ft/sec	Mean Velocity ($\bar{u}$)	**0.92**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**859.1**	cfs	Bankfull Discharge (Q_{bkf})	**863.9**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**860.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**1.50**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**819.0**	cfs	**10** Year **R.I.** Discharge =	**5079.0**	cfs
2.0 Year **R.I.** Discharge =	**1460.0**	cfs	**25** Year **R.I.** Discharge =	**6820.0**	cfs
5.0 Year **R.I.** Discharge =	**3371.0**	cfs	**50** Year **R.I.** Discharge =	**11789.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)	**125-310**	ft	Belt Width (W_{blt})	**300-530**	ft/ft

HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

		Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient	(a)	**13.9**	**0.7**	**9.6**	**0.1**
Slope Exponent	(b)	**0.3**	**0.4**	**0.7**	**0.3**

Hydraulic Radius: $R = A / W_p$	**9.32**	ft	Manning's *'n'* at Bankfull Stage	**0.023**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

Appendix D-1 Fig. 12 USGS Gauge and Field Measurement Calibration (Park River)

NRCS

Summary of USGS Gage Station Data

Station Name:	**Pembina River at Walhalla, ND**				Station Number:	**5099600**	
Station Location:	**Pembina County, 48d54'48" 98d55'00"**				Period of Record:	**80**	yrs
Drainage Area (DA):		acres	**3350**	mi^2	D.A. Mean Elevation:		ft
Stream Type:	**C4**	Landscape Type:		**VI, U-BR-BC**	Mean Annual Disch.:	**293**	cfs
Reference Reach Slope:		**0.0004**	ft/ft		HUC:	09 02 03 16 _ _ _ _ _ _ _ _ _ _ _ _	

BANKFULL CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA ANALYSIS		
Bankfull Width (W_{bkf})	**124.0**	ft	Bankfull Width (W_{bkf})	**130.0**	ft
Bankfull Mean Depth (d_{bkf})	**6.40**	ft	Bankfull Mean Depth (d_{bkf})	**7.00**	ft
Bankfull XS Area (A_{bkf})	**794.00**	ft^2	Bankfull XS Area (A_{bkf})	**807.00**	ft^2
Wetted Perimeter (W_p)	**128.4**	ft	Wetted Perimeter (W_p)		ft
Bankfull Stage (Gage Ht.)		ft	Bankfull Stage (Gage Ht.)		ft
Est. Mean Velocity ($\bar{u}$)	**3.50**	ft/sec	Mean Velocity ($\bar{u}$)	**3.50**	ft/sec
Est. BKF. Discharge (Q_{bkf})	**2779.0**	cfs	Bankfull Discharge (Q_{bkf})	**2824.5**	cfs

Bankfull Discharge associated with field-determined Bankfull Stage	**2800.0**	cfs
Recurrence Interval (R.I.) associated with field-determined Bankfull Stage	**2.00**	yrs

From the *Annual Peak Flow Frequency Analysis* for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	**1588.0**	cfs	**10** Year **R.I.** Discharge =	**11015.0**	cfs
2.0 Year **R.I.** Discharge =	**2793.0**	cfs	**25** Year **R.I.** Discharge =	**17140.0**	cfs
5.0 Year **R.I.** Discharge =	**7079.0**	cfs	**50** Year **R.I.** Discharge =	**22439.0**	cfs

MEANDER GEOMETRY

Linear Wavelength (λ)		ft	Stream Meander Length (L_m)		ft
Radius of Curvature (R_c)		ft	Belt Width (W_{blt})	**450-1000**	ft/ft

HYDRAULIC GEOMETRY

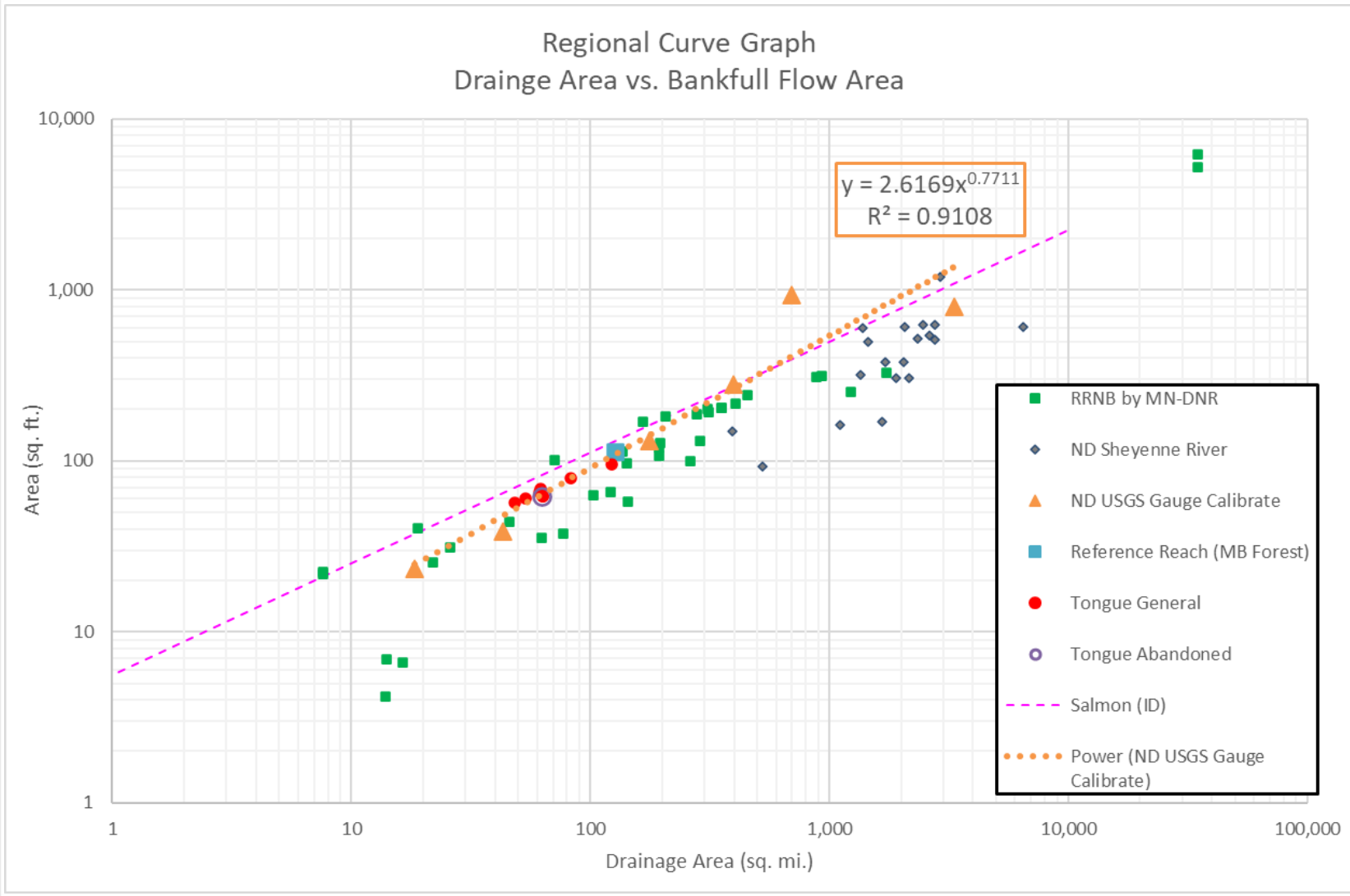
Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity ($\bar{u}$), determine the *intercept coefficient* (***a***) and the *slope exponent* (***b***) values for a power function of the form $Y = aX^b$, when ***Y*** is one of the selected hydraulic parameters and ***X*** is a given discharge value (**Q**).

	Width (**W**)	Depth (**d**)	Area (**A**)	Vel. ($\bar{u}$)
Intercept Coefficient (a)	**14.4**	**0.2**	**3.3**	**0.3**
Slope Exponent (b)	**0.3**	**0.4**	**0.7**	**0.3**

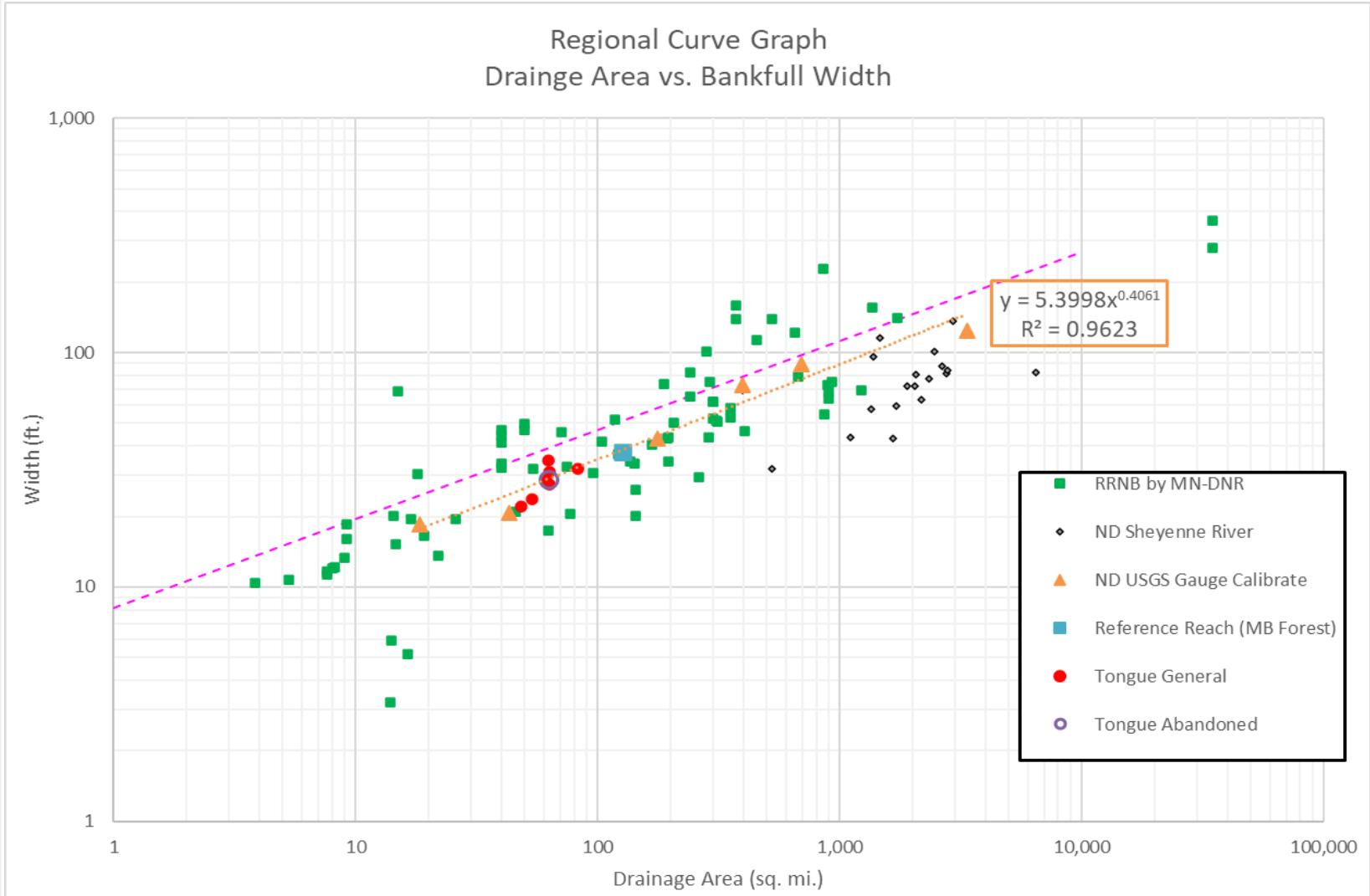
Hydraulic Radius: $R = A / W_p$	**6.18**	ft	Manning's *'n'* at Bankfull Stage	**0.029**	Coeff.

n = 1.49 [(**A**rea) (Hydraulic **R**adius$^{2/3}$) (**S**lope$^{1/2}$)] / Q_{bkf}

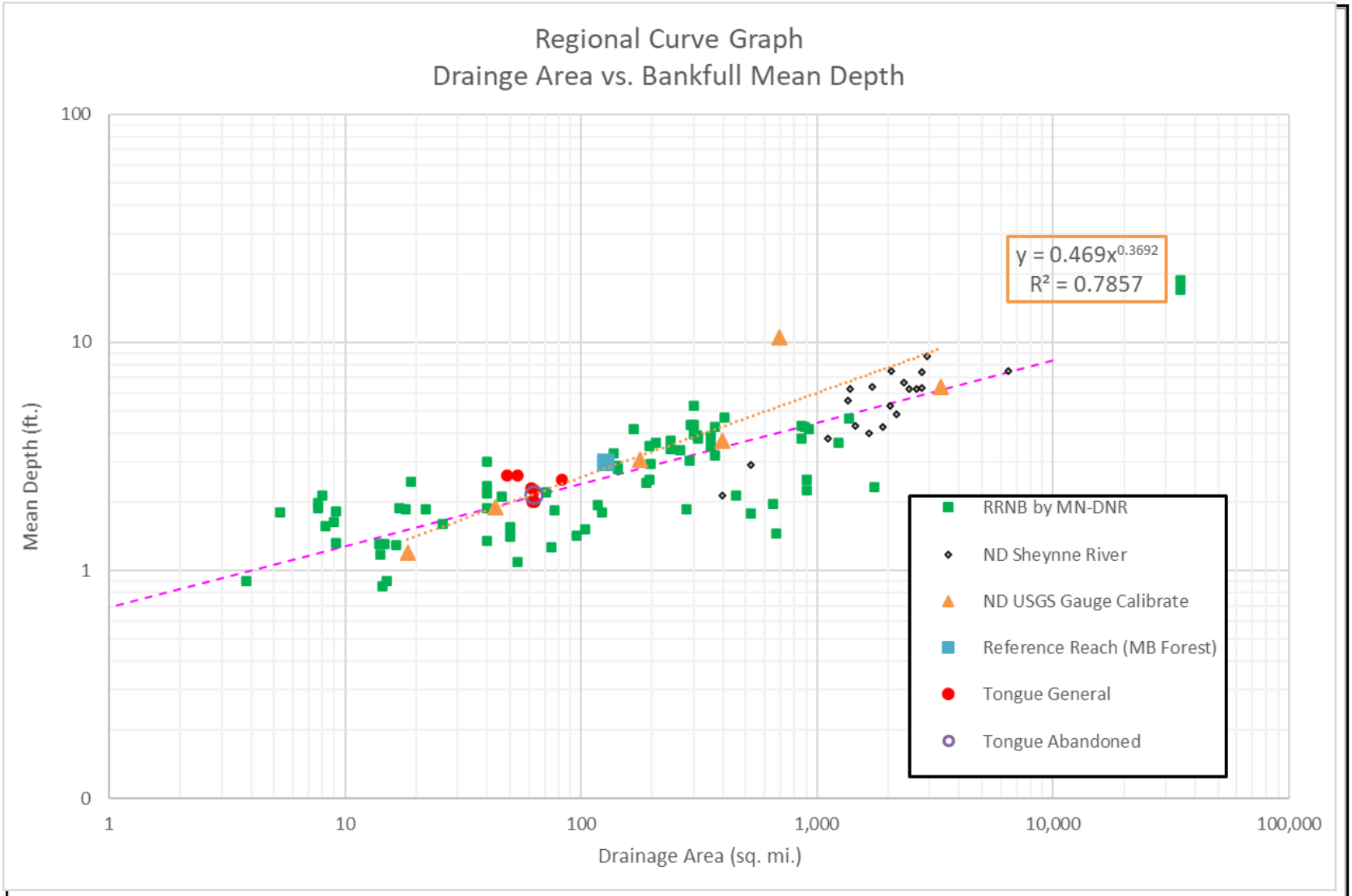
Appendix D-1 Fig. 13 USGS Gauge and Field Measurement Calibration (Pembina River)



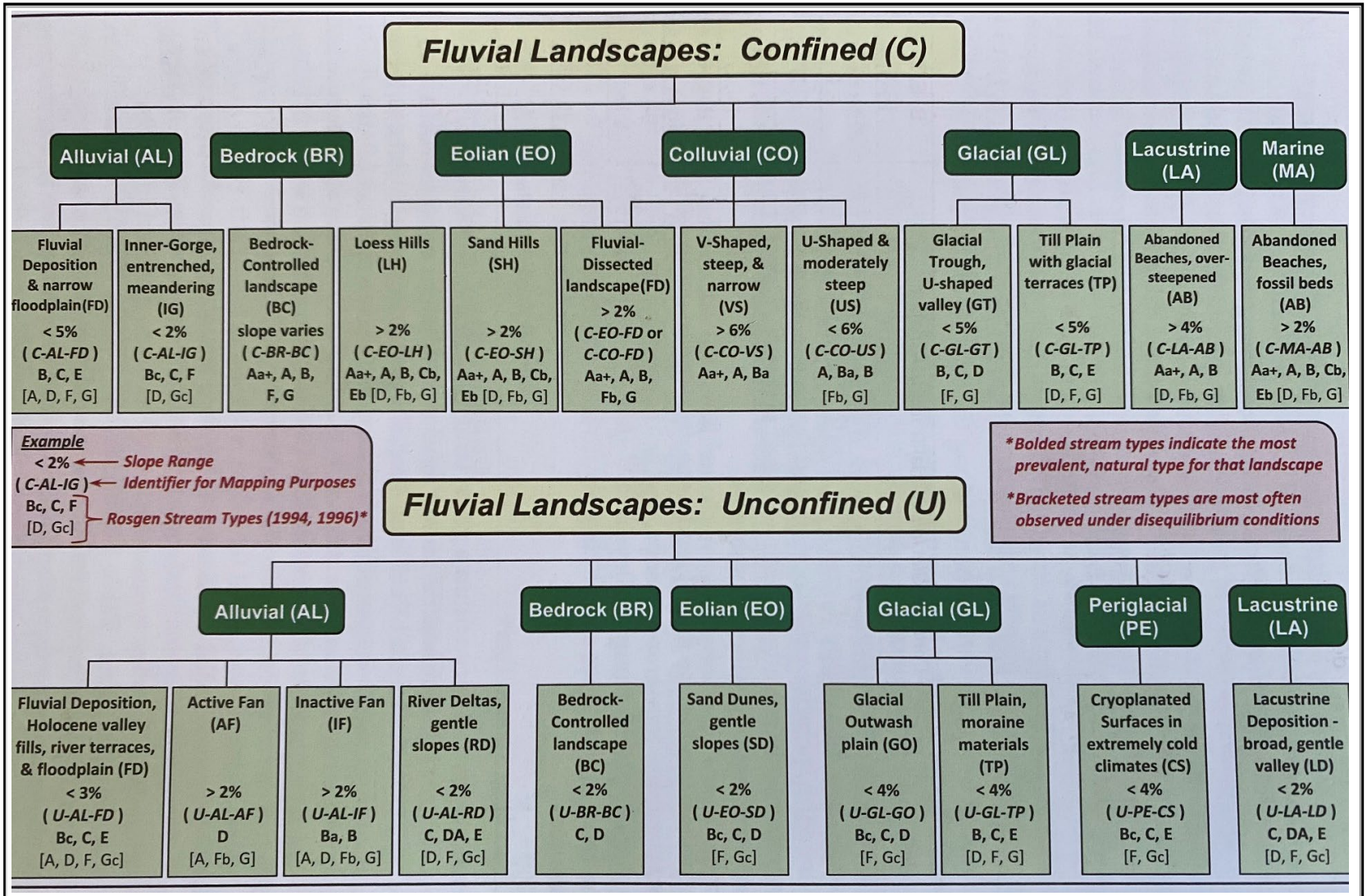
Appendix D-1 Fig. 14 Regional Hydraulic Geometry (Bankfull Flow Area)



Appendix D-1 Fig. 15 Regional Hydraulic Geometry (Bankfull Width)

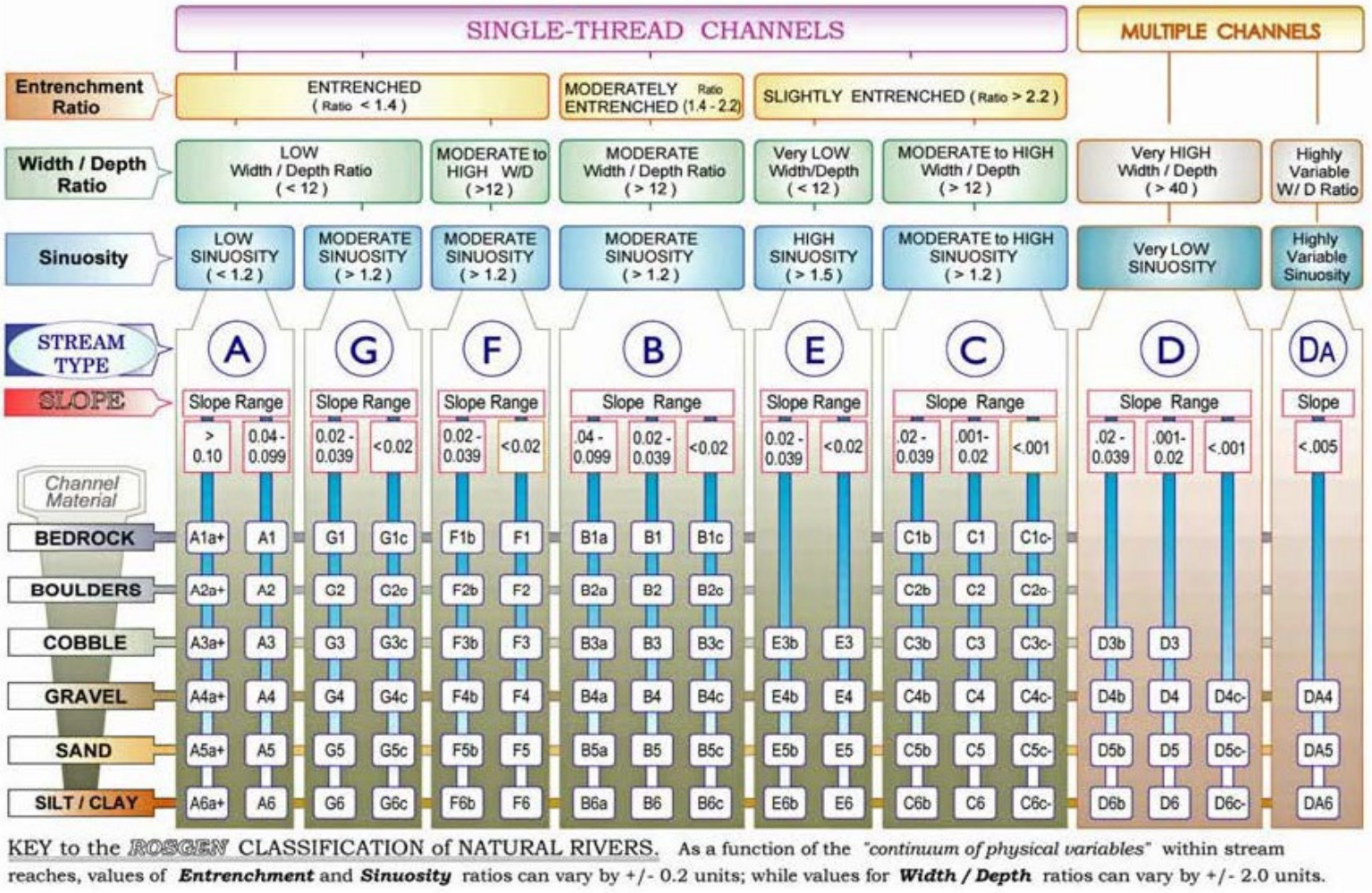


Appendix D-1 Fig. 16 Regional Hydraulic Geometry (Bankfull Depth)



Appendix D-1 Fig. 17 Fluvial Landscapes and Associated Stream Types (Rosgen, 2014)

Figure 11–3 Classification key for natural rivers

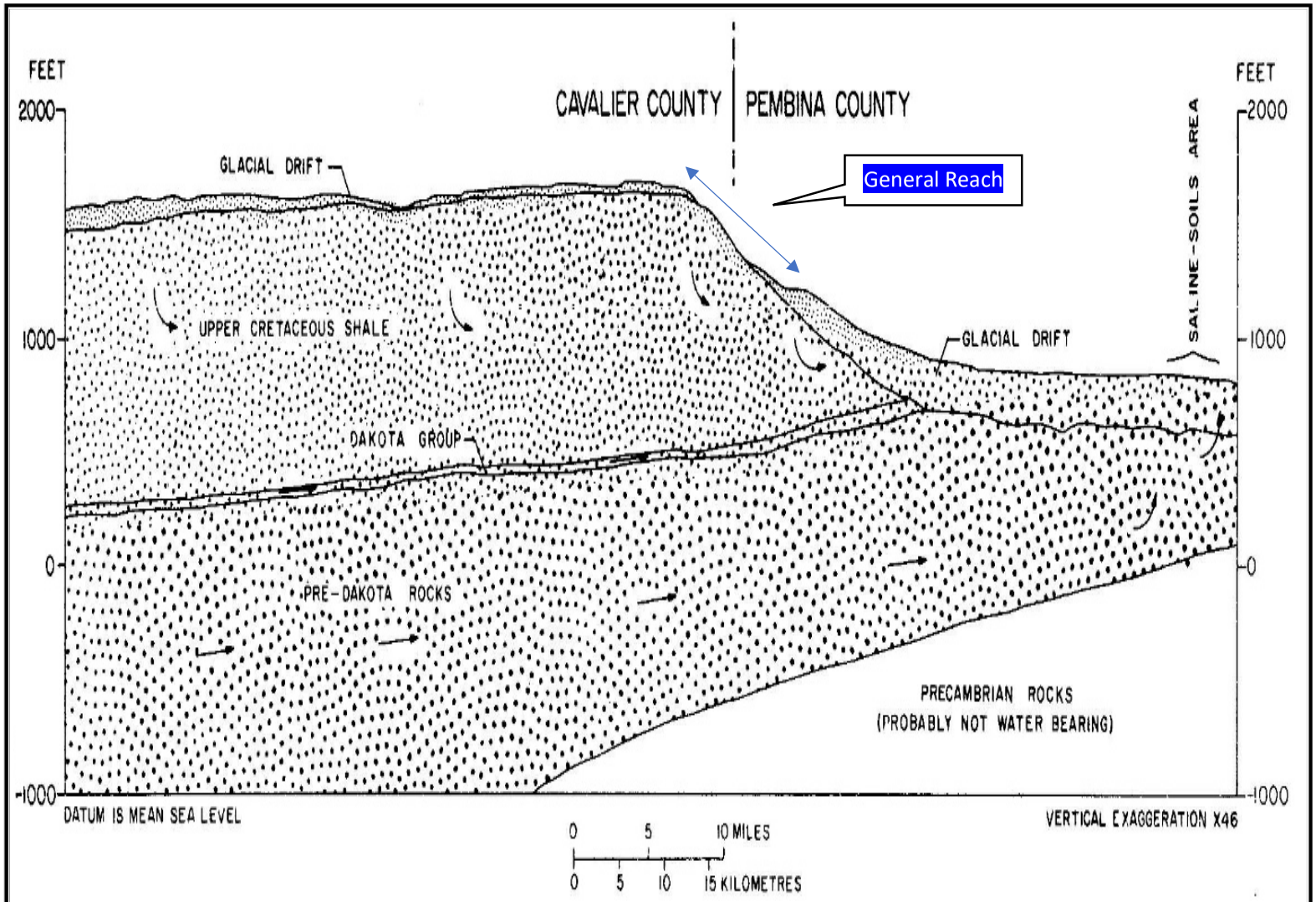


KEY to the *ROSGEN* CLASSIFICATION of NATURAL RIVERS. As a function of the *"continuum of physical variables"* within stream reaches, values of ***Entrenchment*** and ***Sinuosity*** ratios can vary by +/- 0.2 units; while values for ***Width / Depth*** ratios can vary by +/- 2.0 units.

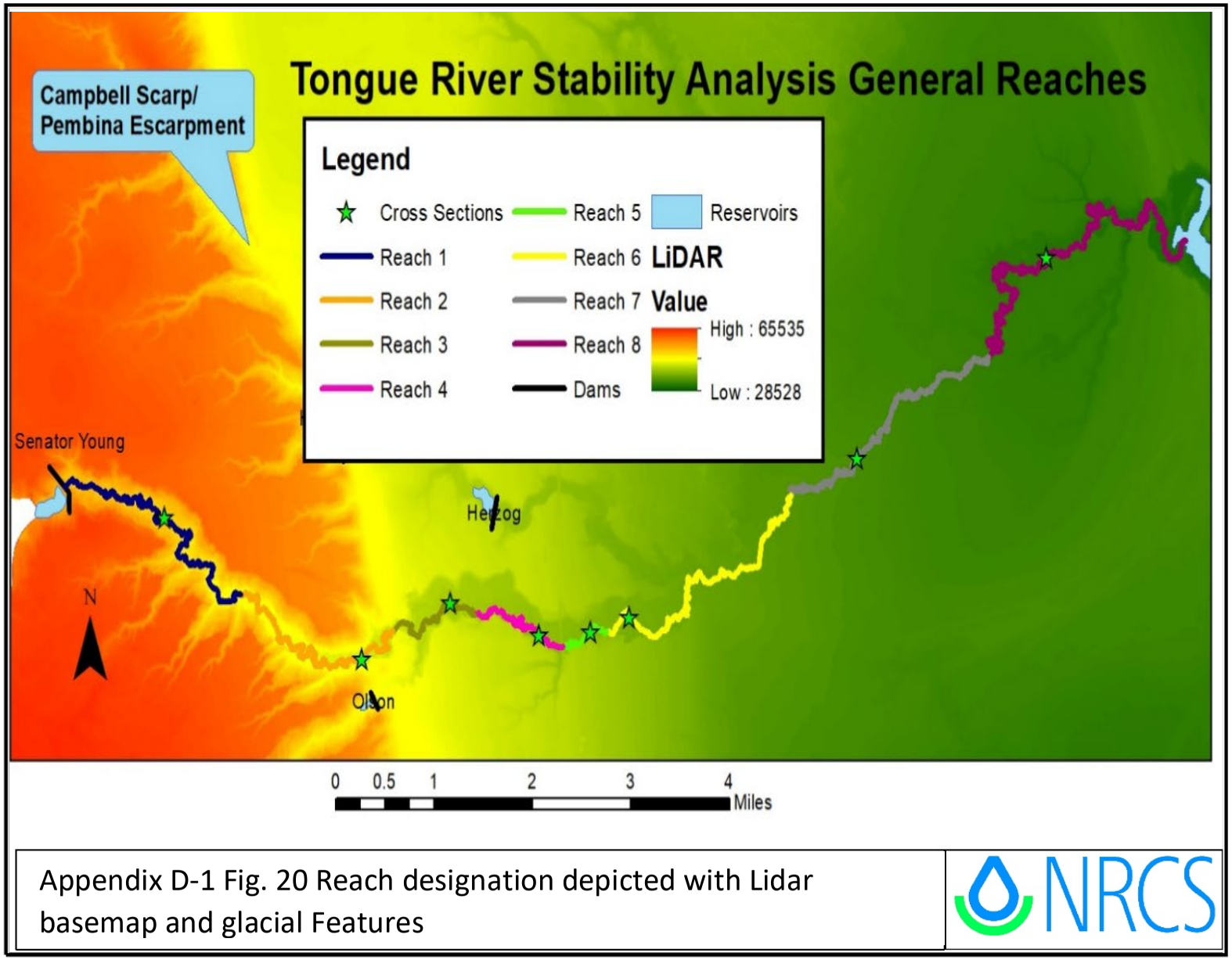
(210-VI-NEH, August 2007)

Appendix D-1 Fig. 18 Classification Key for Natural Rivers (USDA, 2007)

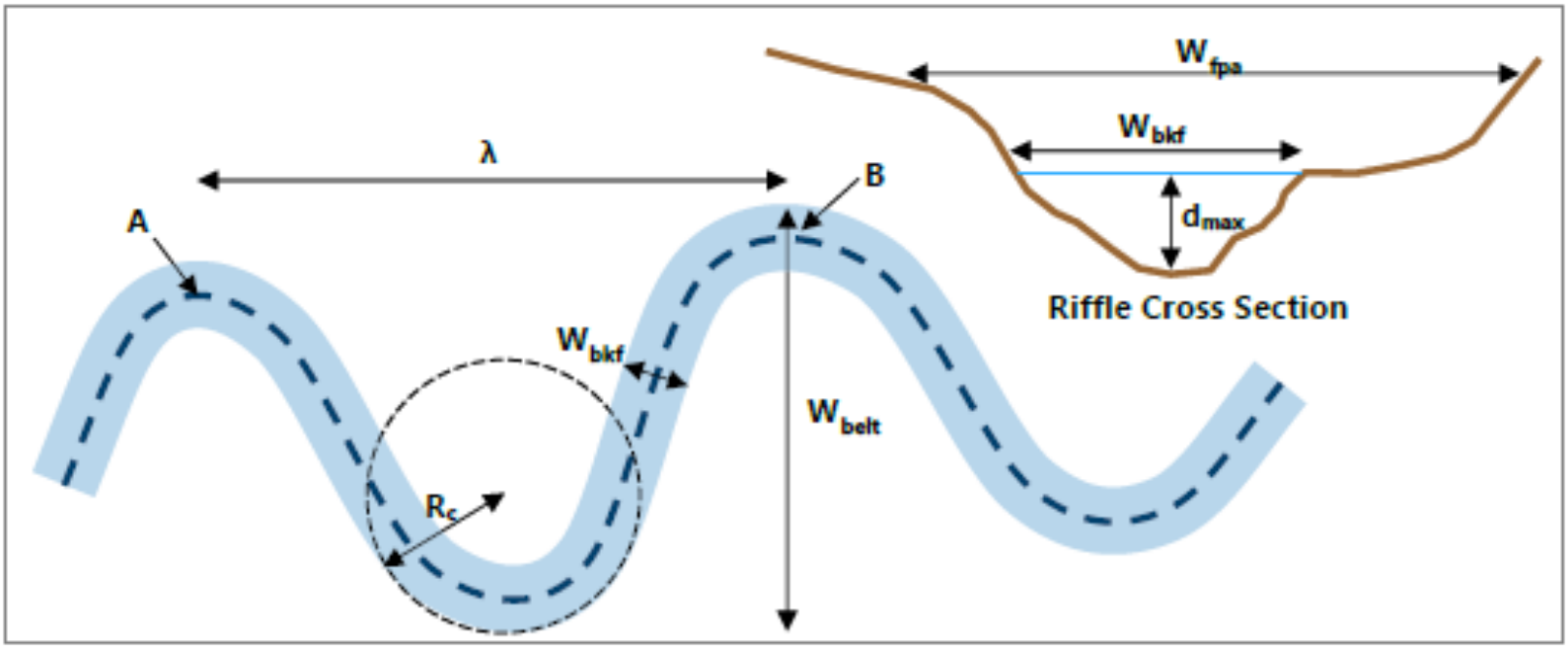
NRCS



Appendix D-1 Fig. 19 Geologic cross section of Cavalier and Pembina Counties (Hutchinson, 1977)



Appendix D-1 Fig. 20 Reach designation depicted with Lidar basemap and glacial Features



Planform:

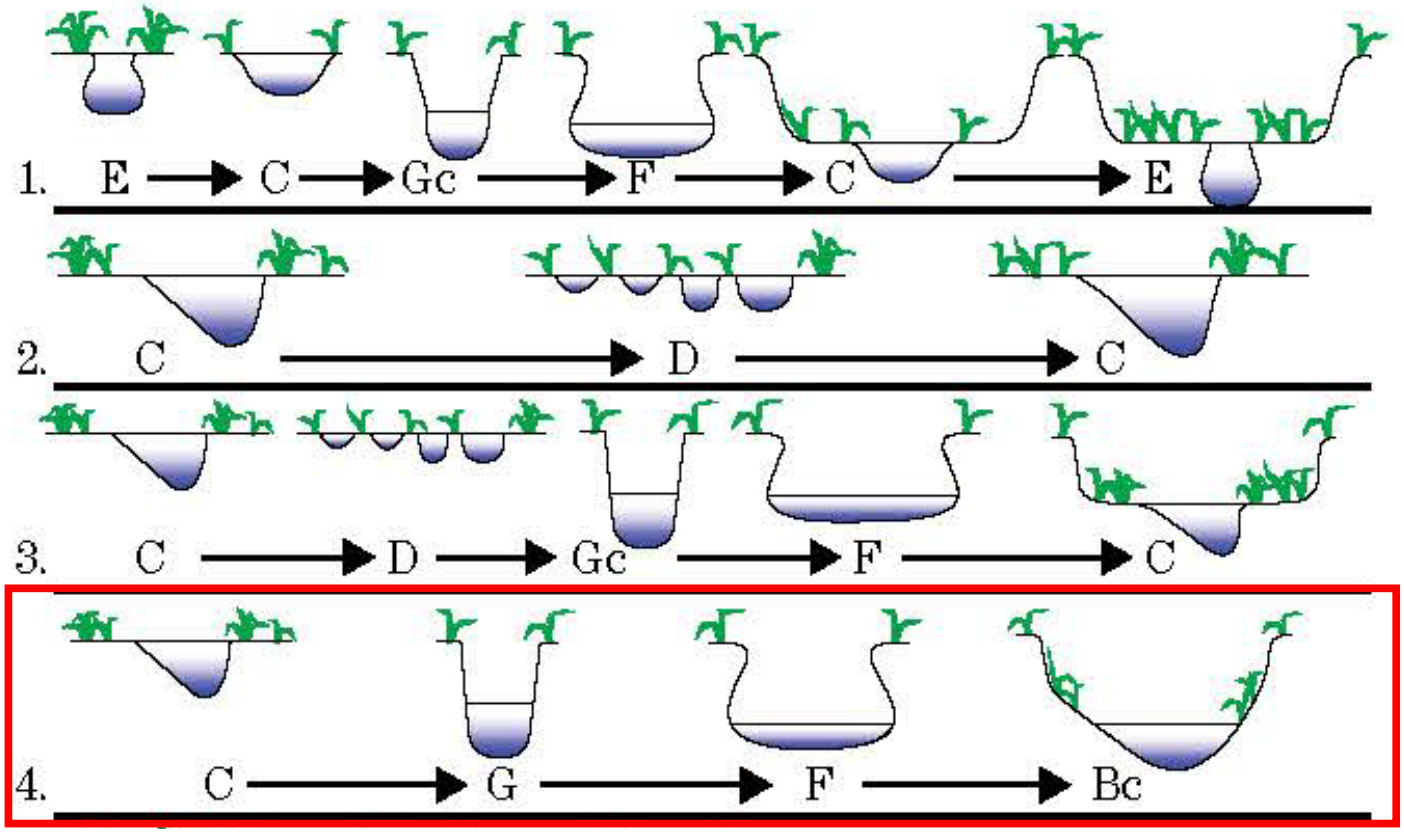
- Sinuosity – Ratio of stream length to valley length, or valley slope to stream slope.
- Belt Width (W_{belt}) – measurement between outside of opposing stream bends.
- Radius of Curvature (R_c)- Measurement of meander bend distance from bankfull outside to intersection of perpendicular tangent lines at curve departure.

Cross Section:

- Bankfull Mean Depth (d_{bkf}) – Riffle mean depth at bankfull stage
- Bankfull Max Depth (d_{max}) – Riffle max depth at bankfull stage
- Bankfull Width (W_{bkf}) – Riffle surface width at bankfull stage
- Bankfull Area (A_{bkf}) – Riffle product of W_{bkf} times d_{bkf}
- Width of floodplain area (W_{fpa}) – Width associated with flood flows that reach an elevation twice bankfull d_{max}.
- Width/Depth Ratio (W/d) – Riffle division of W_{bkf} / d_{bkf}
- Entrenchment Ratio (ER) – Riffle division of W_{fpa} / W_{bkf}

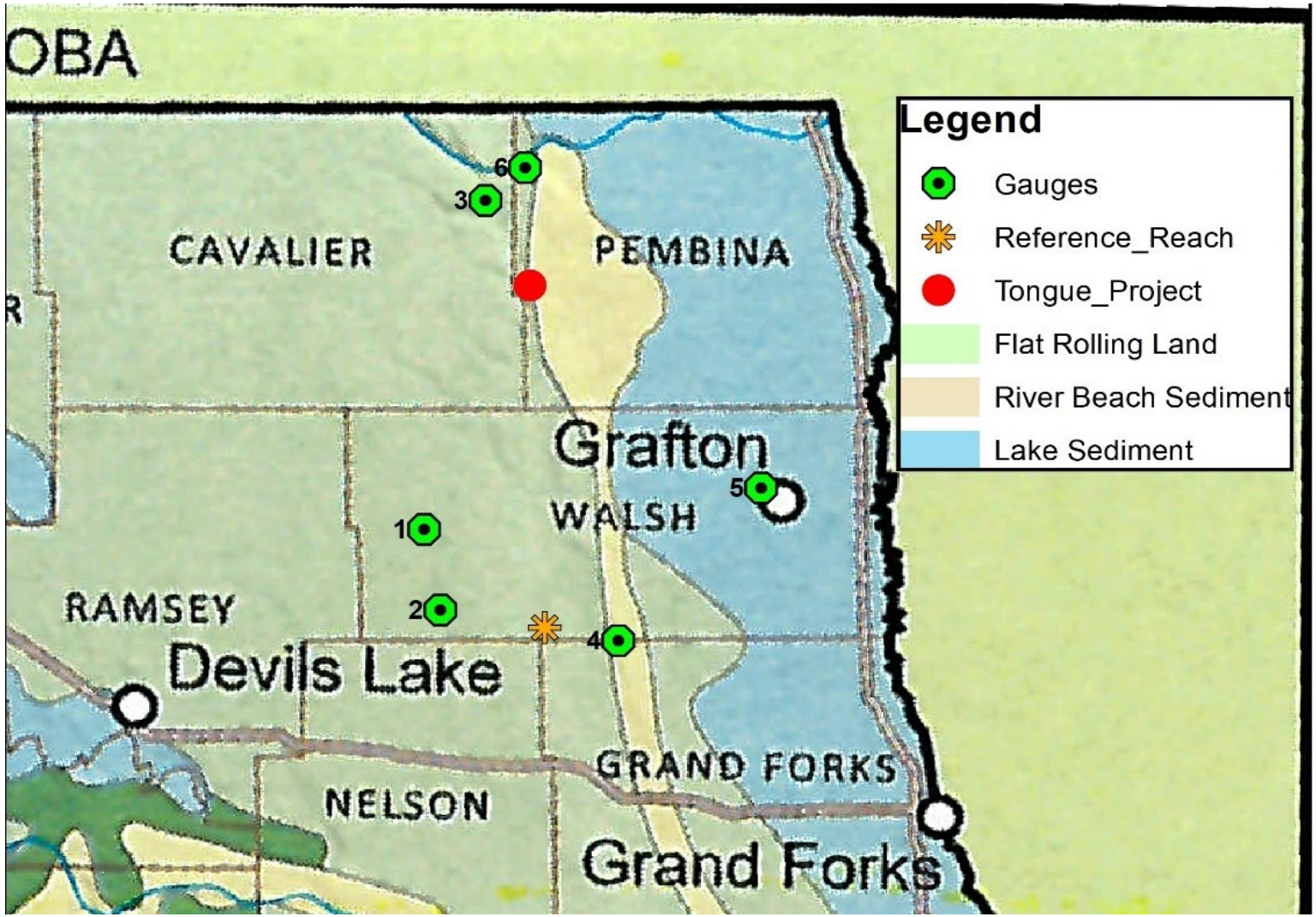
Appendix D-1 Fig. 21 Critical Classification Parameters (Barr, 2019) and (USDA, 2007)

Figure 11–15 Various stream type succession scenarios

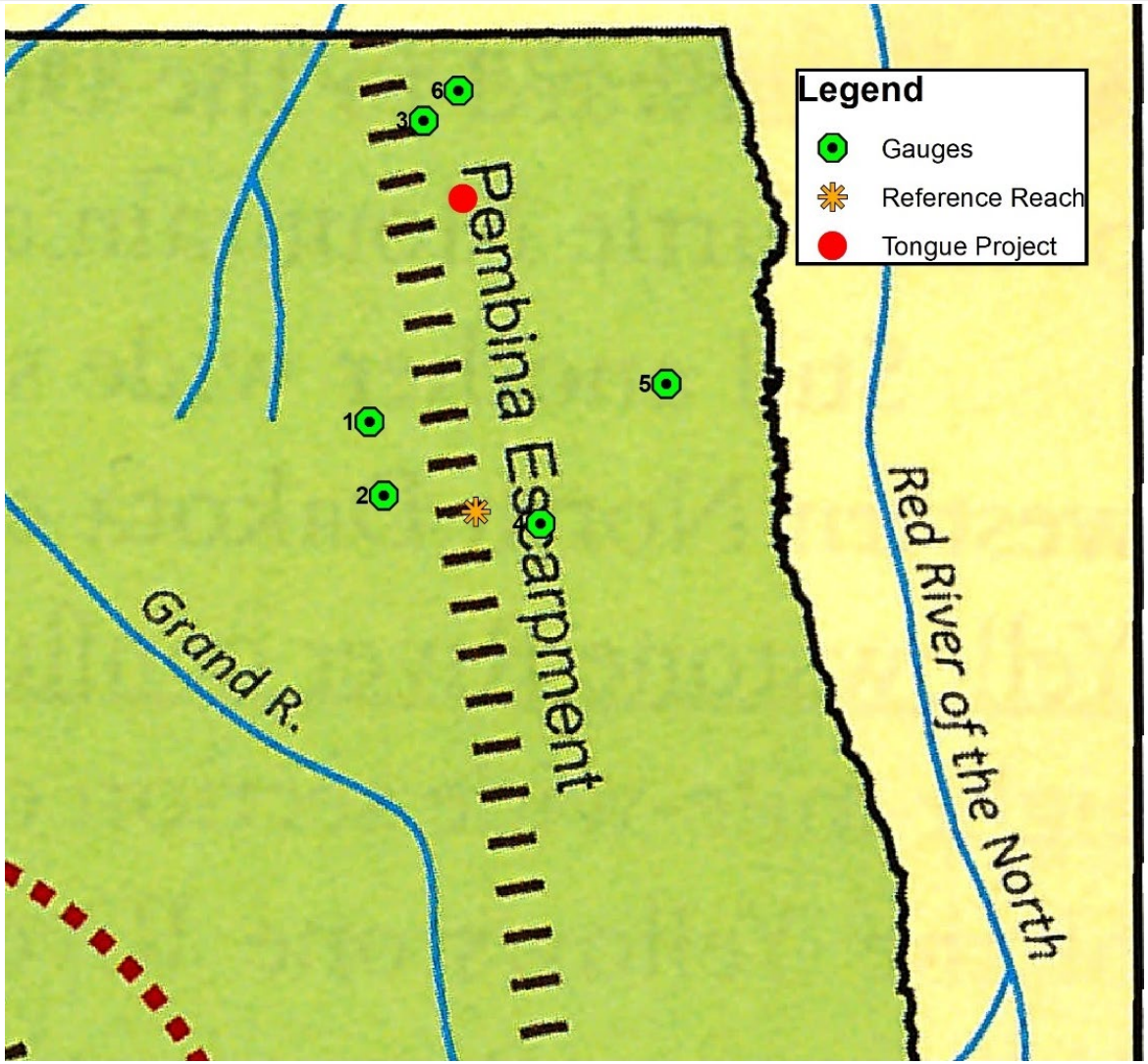


Appendix D-1 Fig. 22 Various Channel Evolution Scenarios Involving Stream Type Succession (USDA, 2007)

NRCS



Appendix D-1 Fig. 23 Basic Geology of Northeastern North Dakota (Bluemle, 2016)



Appendix D-1 Fig. 24 Pembina Escarpment in Northeastern North Dakota (Bluemle, 2016)

USDA

Bankfull VELOCITY & DISCHARGE Estimates

Stream:	Tongue River	Location:	Both sides of Hwy 89
Date:	2015-2020	Stream Type:	C4
Landscape Type:	VI, U-BR-BC		
Observers:	Fisher, Petersen, and all	HUC:	_ _ _ _ _ _ _ _ _ _ _ _

INPUT VARIABLES			OUTPUT VARIABLES		
Bankfull Riffle Cross-Sectional Area	62.4	A_{bkf} (ft^2)	Bankfull Riffle Mean Depth	2.0	d_{bkf} (ft)
Bankfull Riffle Width	31	W_{bkf} (ft)	Wetted Perimeter ≈ (2 * d_{bkf}) + W_{bkf}	35.0	W_p (ft)
D_{84} Particle Size at Riffle	21.2	D_{84} (mm)	D_{84} Particle Size in Feet D_{84} (mm) / 304.8	0.070	D_{84} (ft)
Bankfull Slope	0.003	S_{bkf} (ft / ft)	Hydraulic Radius A_{bkf} / W_p	1.78	R (ft)
Gravitational Acceleration	32.2	g (ft / sec^2)	Relative Roughness R (ft) / D_{84} (ft)	25.6	R / D_{84} (ft / ft)
Drainage Area	63	DA (mi^2)	Shear Velocity $u^* = (gRS)^{½}$	0.41	u^* (ft / sec)

ESTIMATION METHODS	Bankfull VELOCITY		Bankfull DISCHARGE	
1. Friction Factor / Relative Roughness $\bar{u} = [\ 2.83 + 5.66 * Log\{ R / D_{84} \}\ ] u^*$	4.48	ft / sec	279.62	cfs
2. Roughness Coefficient: a) Manning's *n* from Friction Factor/Relative Roughness (Figs. 2-29, 2-30) $\bar{u} = 1.49 * R^{2/3} * S^{1/2} / n$ $n =$ 0.028	4.28	ft / sec	267.28	cfs
2. Roughness Coefficient: b) Manning's *n* from Stream Type (Fig. 2-31) $\bar{u} = 1.49 * R^{2/3} * S^{1/2} / n$ $n =$ 0.032	3.75	ft / sec	233.87	cfs
2. Roughness Coefficient: c) Manning's *n* from Jarrett (USGS): $\bar{u} = 1.49 * R^{2/3} * S^{1/2} / n$ $n = 0.39 * S^{0.38} * R^{-0.16}$ Note: This equation is applicable to steep, step/pool, high boundary roughness, cobble- and boulder-dominated stream systems; i.e., for Stream Types A1, A2, A3, B1, B2, B3, C2 & E3 $n =$		ft / sec		cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.) Manning's Limerinos n=0.026	4.61	ft / sec	287.7	cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.) Darcy-Weisbach (Leopold, Wolman and Miller)	4.56	ft / sec	284.5	cfs
4. Continuity Equations: a) USGS Gage Data $\bar{u} = Q / A$ Return Period for Bankfull Q $Q =$ year		ft / sec		cfs
4. Continuity Equations: b) Regional Curves $\bar{u} = Q / A$		ft / sec		cfs

Protrusion Height Options for the D_{84} Term in the Relative Roughness Relation (R/D_{84}) – Estimation Method 1

Option 1. For **sand-bed** channels: Measure 100 **"protrusion heights"** of sand dunes from the downstream side of feature to the top of feature. Substitute the D_{84} sand dune protrusion height in ft for the D_{84} term in method 1.

Option 2. For **boulder-dominated** channels: Measure 100 **"protrusion heights"** of boulders on the sides from the bed elevation to the top of the rock on that side. Substitute the D_{84} boulder protrusion height in ft for the D_{84} term in method 1.

Option 3. For **bedrock-dominated** channels: Measure 100 **"protrusion heights"** of rock separations, steps, joints or uplifted surfaces above channel bed elevation. Substitute the D_{84} bedrock protrusion height in ft for the D_{84} term in method 1.

Option 4. For **log-influenced** channels: Measure **"protrustion heights"** proportionate to channel width of log diameters or the height of the log on upstream side if embedded. Substitute the D_{84} protrusion height in ft for the D_{84} term in method 1.

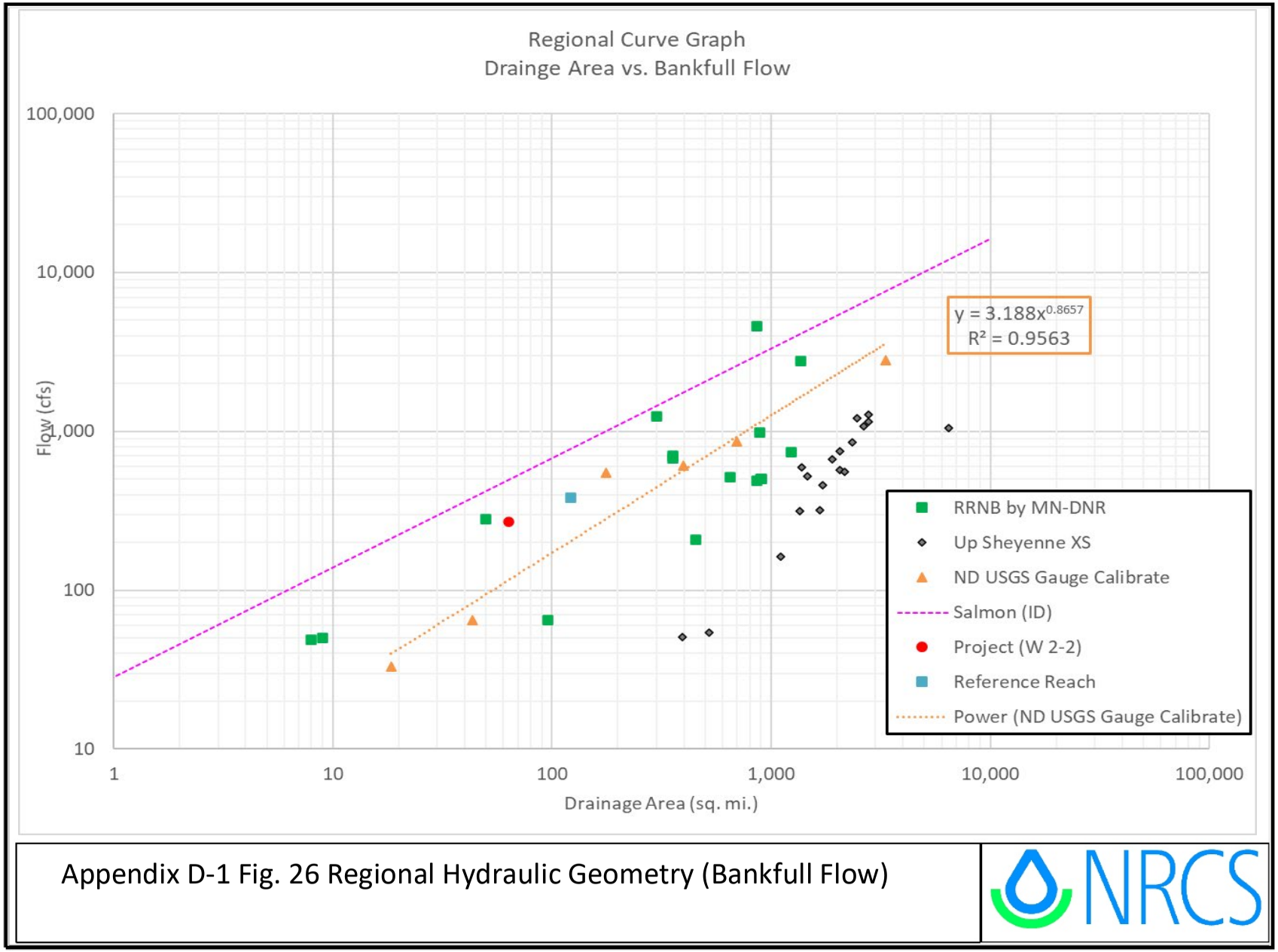
Stream:	Tongue River		
Basin:	Drainage Area:	acres	63 mi^2
Location:	Both sides of Hwy 89		
Twp.&Rge:	161/56	Sec.&Qtr.:	28 & 29
Cross-Section Monuments (Lat./Long.):		Date:	2015-2020
Observers:	Fisher, Petersen, and all	Landscape Type:	VI, U-BR-B

Bankfull Width (W_{bkf}) The surface width of the stream at bankfull stage elevation, in a riffle section.	31.0	ft
Bankfull Mean Depth (d_{bkf}) Mean depth of the stream channel cross-section, at bankfull stage elevation, in a riffle section ($d_{bkf} = A_{bkf} / W_{bkf}$).	2.00	ft
Bankfull Cross-Sectional Area (A_{bkf}) Area of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	62.4	ft^2
Width/Depth Ratio (W_{bkf} / d_{bkf}) *Bankfull Width* divided by *Bankfull Mean Depth*, in a riffle section.	15.5	ft/ft
Bankfull Maximum Depth (d_{max}) Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and Thalweg elevations, in a riffle section.	2.90	ft
Flood-Prone Area Width (W_{fpa}) Width of the channel at an elevation that is twice the *Bankfull Maximum Depth*, measured perpendicular to the fall line of the valley in a riffle section.	55.00	ft
Entrenchment Ratio (ER) The *Flood-Prone Area Width* divided by *Bankfull Width* (W_{fpa} / W_{bkf}), in a riffle section.	1.30	ft/ft
Channel Materials (Particle Size Index D_{50}) The D_{50} particle size index represents the median or dominant diameter of channel materials, as sampled proportionately from the channel surface between the bankfull stage and Thalweg elevations.	7	mm
Average Water Surface Slope (S) The elevation difference of water surface measurements over the stream length between two similar bed features (e.g., start of riffle to start of last riffle) for several riffle–pool or step–pool sequences, representing channel gradient.	0.0030	ft/ft
Channel Sinuosity (k) An index of channel pattern determined from stream length divided by valley length (SL / VL), or from valley slope divided by average water surface slope (S_{val} / S).	1.54	ft/ft

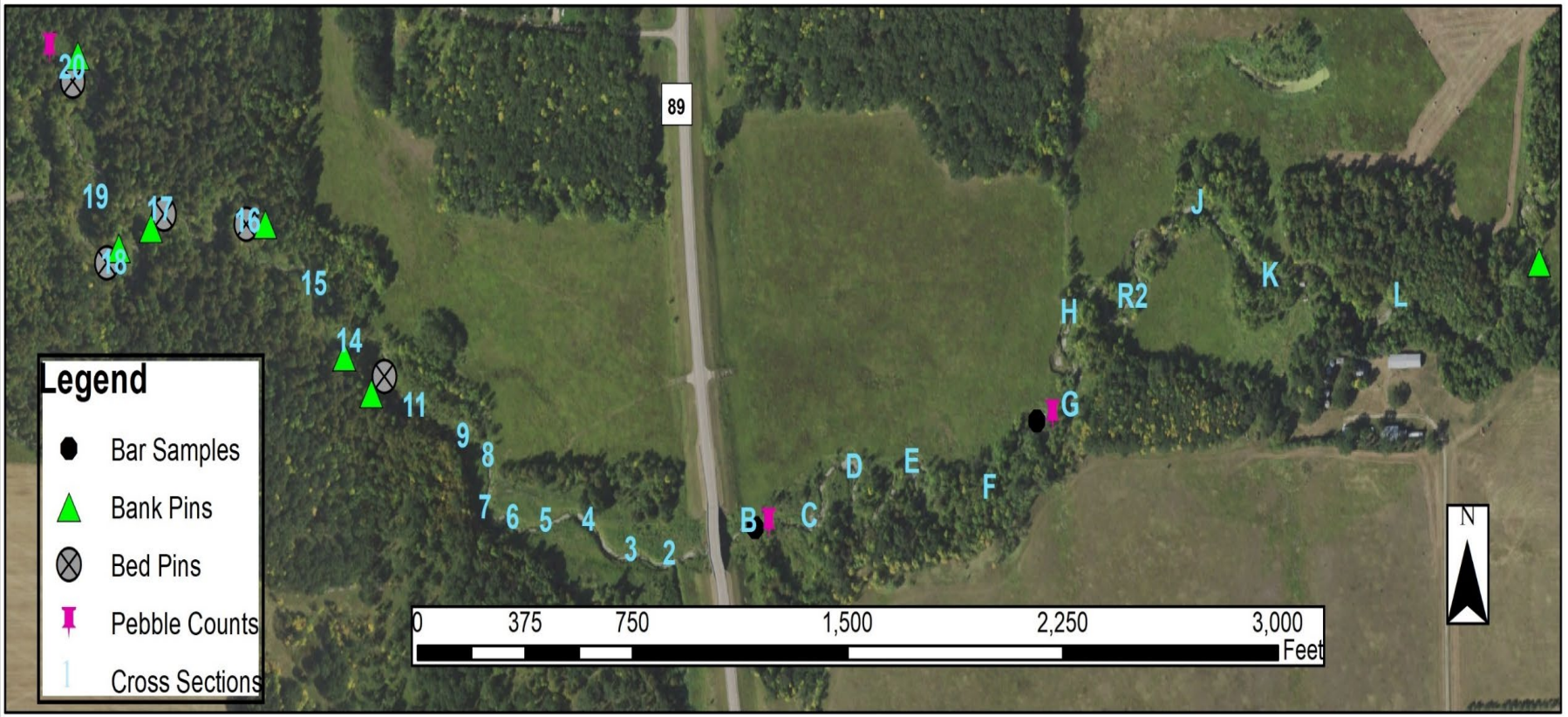
Stream Type **B4c & B/F** See Classification Key (Figure 2-35)

Appendix D-1 Fig. 25 Project Reach Bankfull Estimates and Classification

NRCS



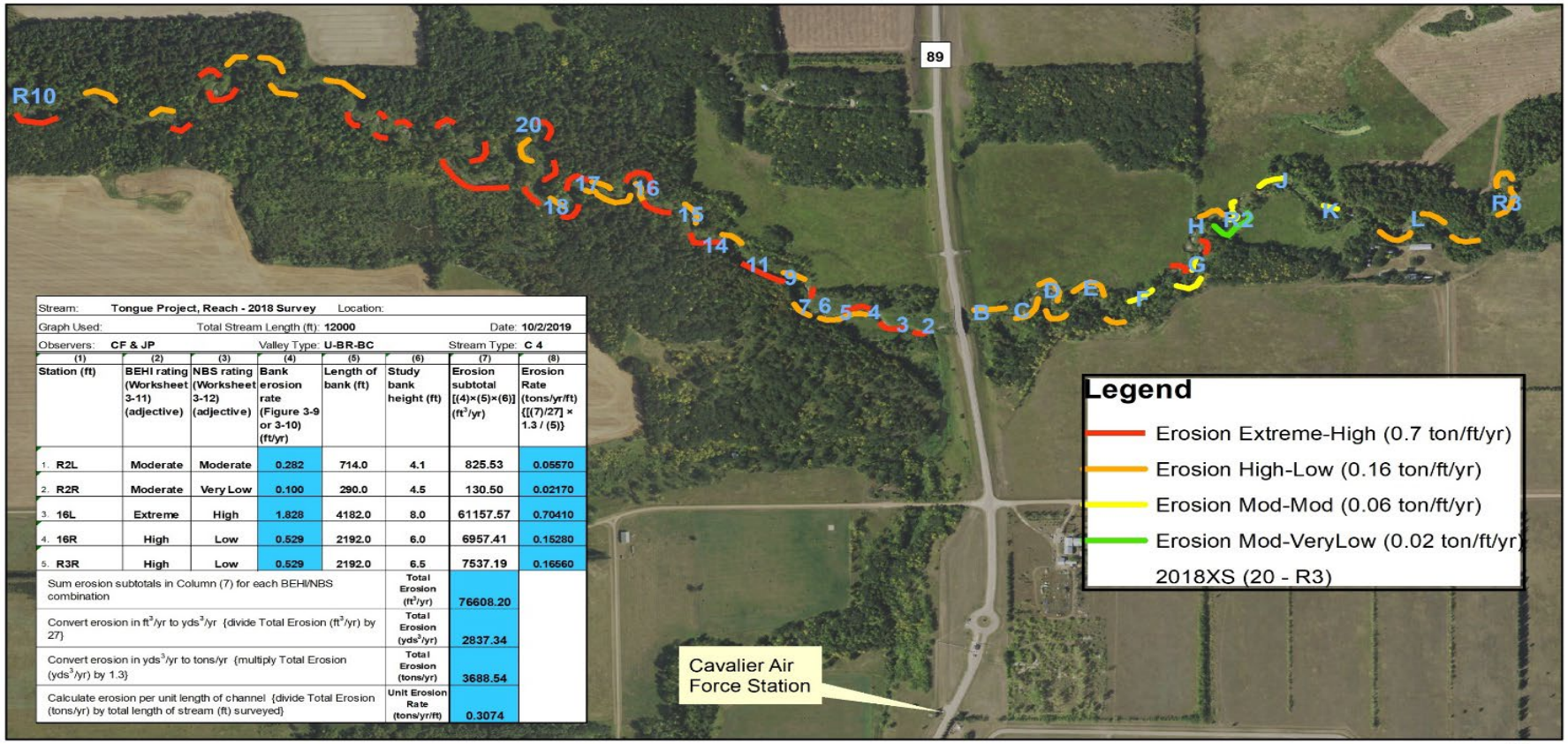
Appendix D-1 Fig. 26 Regional Hydraulic Geometry (Bankfull Flow)



Appendix D-1 Fig. 27 Summary of Field Data Collection Sites

NRCS

Tongue River Project Reach Bank Stability Erosion Analysis



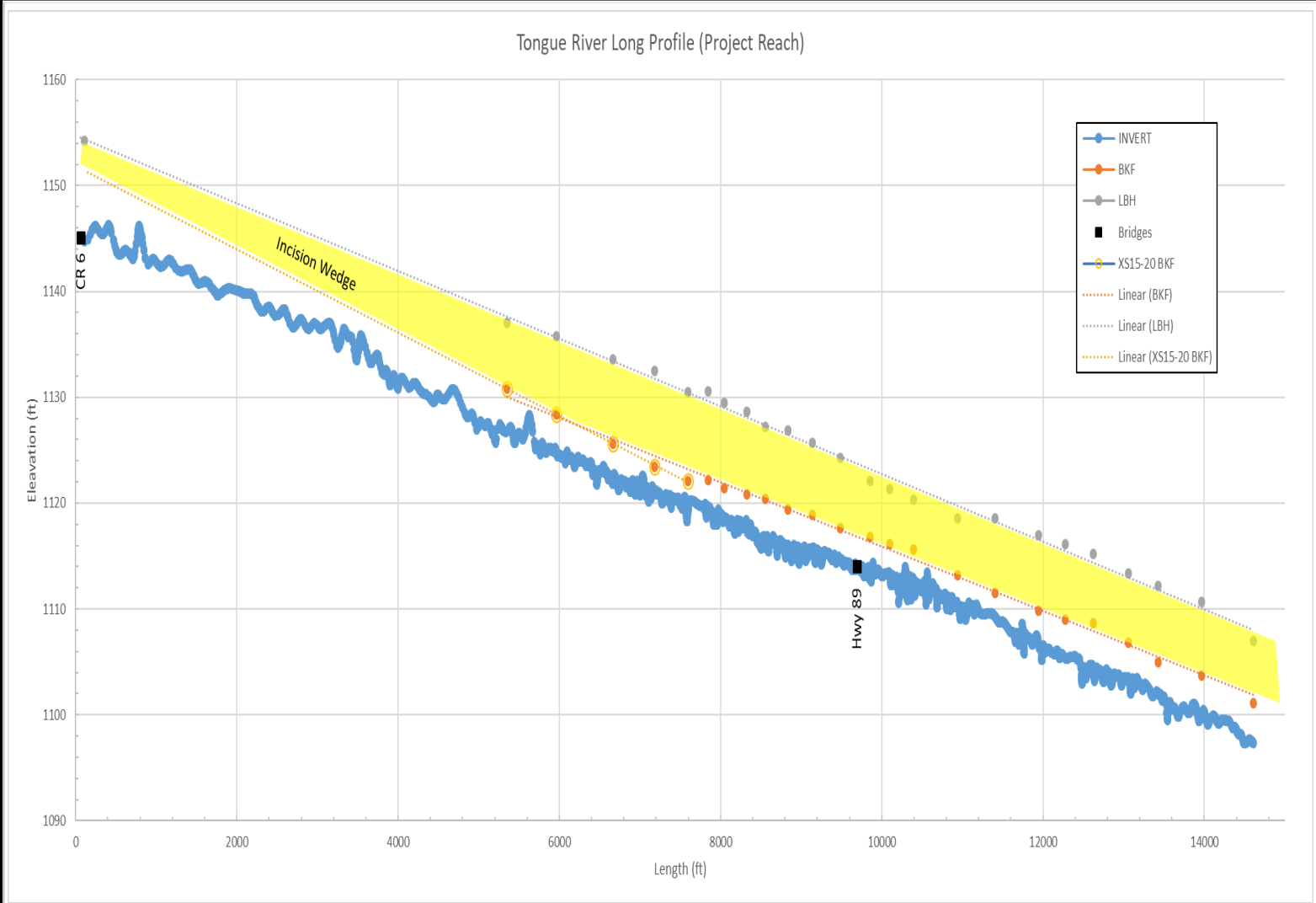
Stream: **Tongue Project, Reach - 2018 Survey** Location:

Graph Used: Total Stream Length (ft): **12000** Date: **10/2/2019**

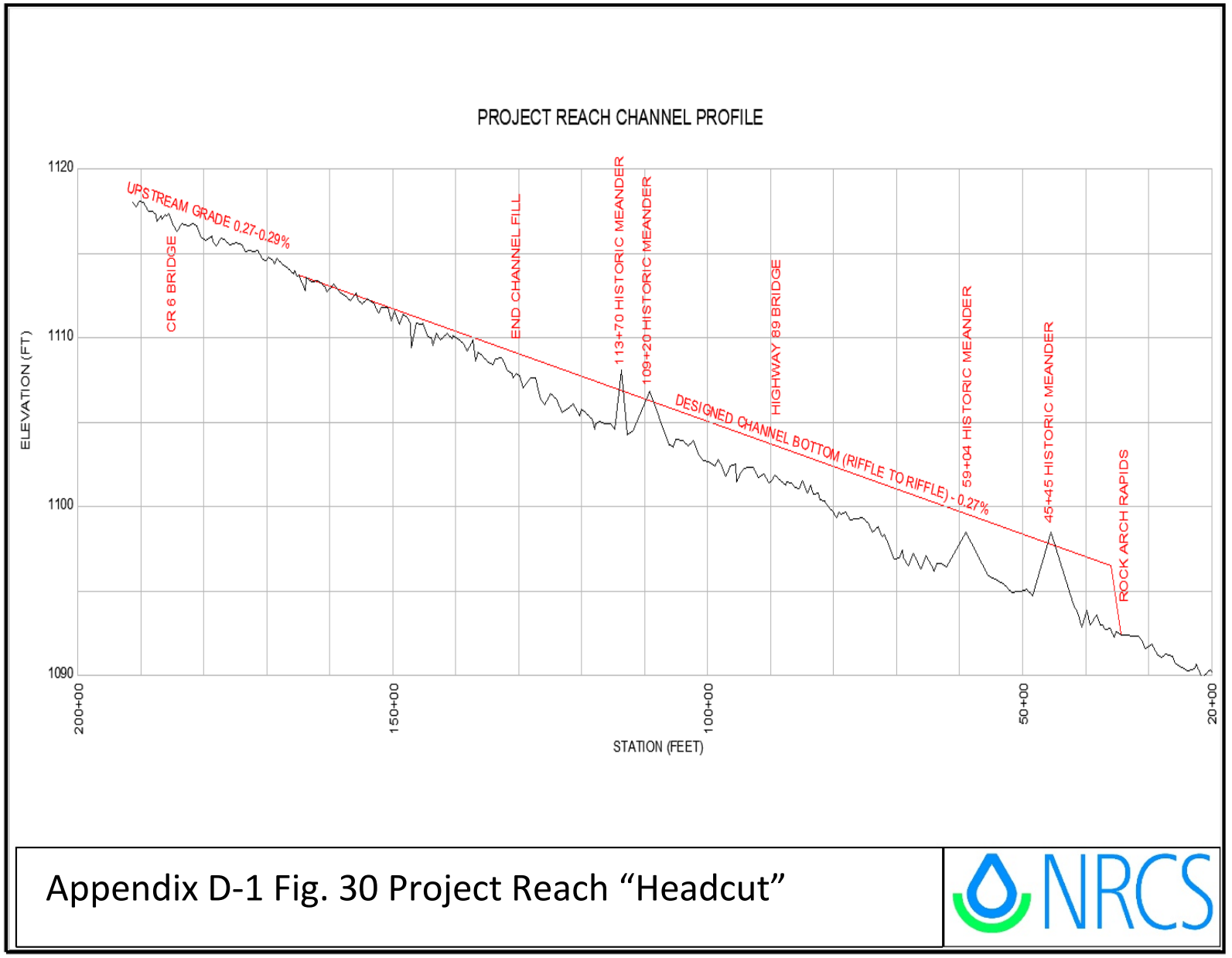
Observers: **CF & JP** Valley Type: **U-BR-BC** Stream Type: **C 4**

(1) Station (ft)	(2) BEHI rating (Worksheet 3-11) (adjective)	(3) NBS rating (Worksheet 3-12) (adjective)	(4) Bank erosion rate (Figure 3-9 or 3-10) (ft/yr)	(5) Length of bank (ft)	(6) Study bank height (ft)	(7) Erosion subtotal [(4)×(5)×(6)] (ft^3/yr)	(8) Erosion Rate (tons/yr/ft) {[(7)/27] × 1.3 / (5)}
1. R2L	Moderate	Moderate	0.282	714.0	4.1	825.53	0.05570
2. R2R	Moderate	Very Low	0.100	290.0	4.5	130.50	0.02170
3. 16L	Extreme	High	1.828	4182.0	8.0	61157.57	0.70410
4. 16R	High	Low	0.529	2192.0	6.0	6957.41	0.15280
5. R3R	High	Low	0.529	2192.0	6.5	7537.19	0.16560
Sum erosion subtotals in Column (7) for each BEHI/NBS combination					Total Erosion (ft^3/yr)	76608.20	
Convert erosion in ft^3/yr to yds^3/yr {divide Total Erosion (ft^3/yr) by 27}					Total Erosion (yds^3/yr)	2837.34	
Convert erosion in yds^3/yr to tons/yr {multiply Total Erosion (yds^3/yr) by 1.3}					Total Erosion (tons/yr)	3688.54	
Calculate erosion per unit length of channel {divide Total Erosion (tons/yr) by total length of stream (ft) surveyed}					Unit Erosion Rate (tons/yr/ft)	0.3074	

Appendix D-1 Fig. 28 Project Reach Bank Stability Erosion Analysis



Appendix D-1 Fig. 29 Long profile incision wedge



Appendix D-1 Fig. 30 Project Reach “Headcut”

Stream:	**Tongue Project**		Stream Type:	**C 4**	
Location:	**2018 Survey**		Valley Type:	**U-BR-BC**	
Observers:	**CF & JP**		Date:	**10/24/2018**	

Enter Required Information for Existing Condition

8.8	D_{50}	Median particle size of riffle bed material (mm)			
6.9	$D^{\wedge}_{50}$	Median particle size of bar or sub-pavement sample (mm)			
0.098	D_{max}	Largest particle from bar sample (ft)	**30**	**(mm)**	304.8 mm/ft
0.00326	S	Existing bankfull water surface slope (ft/ft)			
1.56	d	Existing bankfull mean depth (ft)			
1.65	$\gamma_s-\gamma/\gamma$	Immersed specific gravity of sediment			

Select the Appropriate Equation and Calculate Critical Dimensionless Shear Stress

1.27	$D_{50}/D^{\wedge}_{50}$	Range: 3 – 7	Use EQUATION 1: $\tau^* = 0.0834\,(D_{50}/D^{\wedge}_{50})^{-0.872}$	
3.42	D_{max}/D_{50}	Range: 1.3 – 3.0	Use EQUATION 2: $\tau^* = 0.0384\,(D_{max}/D_{50})^{-0.887}$	
0.013	τ^*	Bankfull Dimensionless Shear Stress	EQUATION USED:	**2**

Calculate Bankfull Mean Depth Required for Entrainment of Largest Particle in Bar Sample

0.64	**d**	Required bankfull mean depth (ft) $d = \frac{\tau^*(\gamma_s - 1)D_{max}}{S}$	(use D_{max} in ft)

Calculate Bankfull Water Surface Slope Required for Entrainment of Largest Particle in Bar Sample

0.00134	**S**	Required bankfull water surface slope (ft/ft) $S = \frac{\tau^*(\gamma_s - 1)D_{max}}{d}$	(use D_{max} in ft)

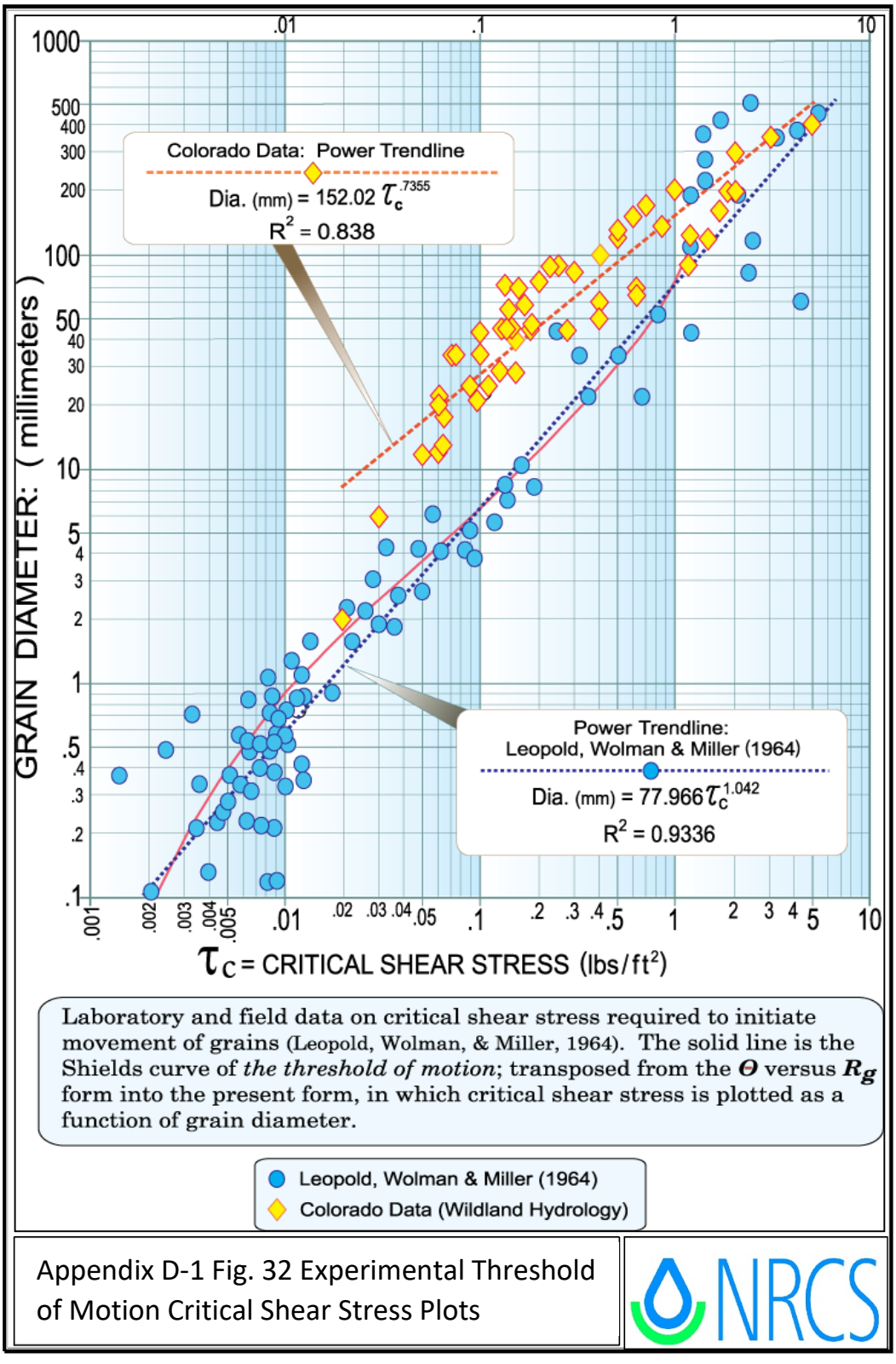
Check: ☐ Stable ☐ Aggrading ☑ Degrading

Sediment Competence Using Dimensional Shear Stress

0.317		Bankfull shear stress $\tau = \gamma dS$ (lbs/ft^2) (substitute hydraulic radius, R, with mean depth, d) γ = 62.4, d = existing depth, S = existing slope
Shields **23.58**	CO **65.35**	Predicted largest moveable particle size (mm) at bankfull shear stress τ **(Figure 3-11)**
Shields **0.4**	CO **0.11**	Predicted shear stress required to initiate movement of measured D_{max} (mm) **(Figure 3-11)**
Shields **1.97**	CO **0.54**	Predicted mean depth required to initiate movement of measured D_{max} (mm) $d = \frac{\tau}{\gamma S}$ τ = predicted shear stress, γ = 62.4, S = existing slope
Shields **0.0041**	CO **0.0011**	Predicted slope required to initiate movement of measured D_{max} (mm) $S = \frac{\tau}{\gamma d}$ τ = predicted shear stress, γ = 62.4, d = existing depth

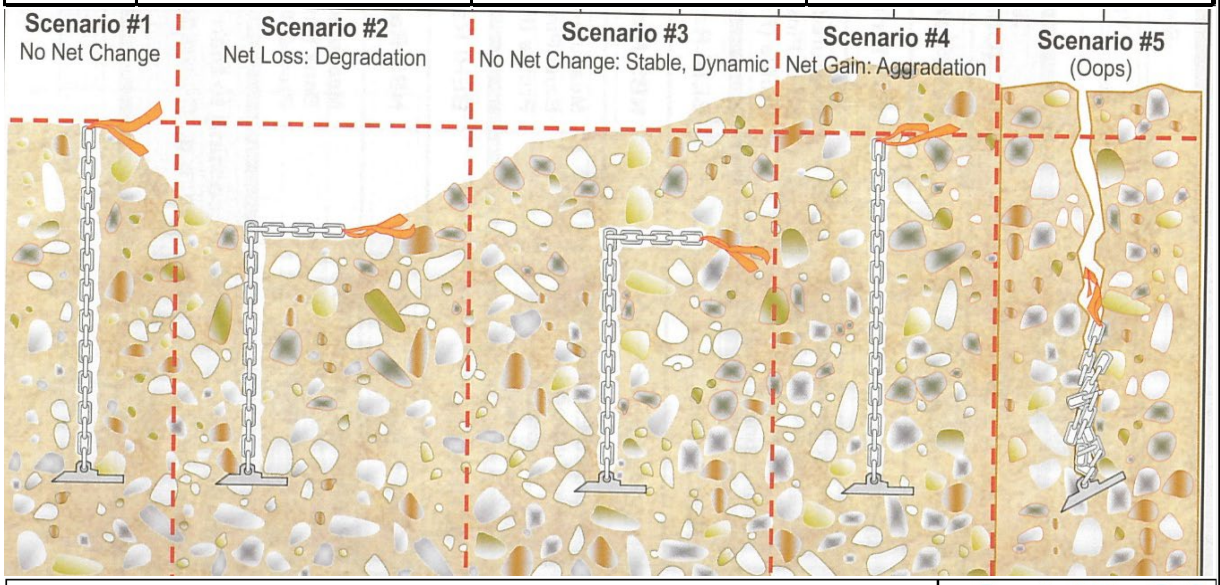
Check: ☑ Stable ☐ Aggrading ☐ Degrading

Appendix D-1 Fig. 31 Sediment Competence Calculation Form for Bed Stability



Appendix D-1 Fig. 32 Experimental Threshold of Motion Critical Shear Stress Plots

Cross Section	2018 Scenario	2019 Scenario	Summary
12	#3: Scour 2', filled 2.25'	#3: Scour >2', filled >2.18'	Stable, Dynamic
16	#3: Scour 0.3', filled 0.4'	#2: Scour 0.2', no backfill	Stable, Dynamic/Degradation
17	#2: Scour 0.4', no backfill	#2: Scour 0.3', no backfill	Degradation
18	#2: Scour 0.3', filled 0.2'	#2: Scour 0.8', filled 0.3'	Degradation
20	#3: Scour 0.7', filled 0.7'	Beaver Dam built	Stable, Dynamic



Appendix D-1 Fig. 33 Scour Chain Scenarios (Rosgen, 2014)

H1

GARRISON DIVERSION
CONSERVANCY DISTRICT
P.O. BOX 140
CARRINGTON, N.D. 58421
(701) 652-3194
FAX (701) 652-3195
gdcd@gdcd.org
www.garrisondiversion.org

October 25, 2021

Governor Doug Burgum
Chairman – North Dakota State Water Commission
900 East Boulevard Avenue, Dept 770
Bismarck, ND 58505-0850

Re: RRVWSP Loan Request from Water Infrastructure Revolving Loan Fund

Dear Governor Burgum:

Please accept this letter as our formal request for loan eligibility from the State's newest water financing loan program created under H.B. 1431 in the 67th Legislative Assembly. H.B. 1431 directs that the State Water Commission (SWC) shall approve eligible water supply projects for loans from the Water Infrastructure Revolving Loan Fund (WIRLF) in consideration of the following criteria:

1. **Nature and Description of the Proposed Project:** The Red River Valley Water Supply Project (RRVWSP) is a 165 mile long, 72-inch steel pipeline with a capacity of 165 cubic feet per second (cfs). The Project is designed to convey emergency and supplemental water supply from the Missouri River water to water systems throughout central and eastern North Dakota.
2. **Estimated Cost of Project:** The total project cost is estimated at $1.22 billion in 2021$. Current project funding approved at both the State and local level totals $112.3 million. This amount includes:
    a. $36.4 million approved in the 2019-2021 biennium
    b. $50 million designated in the 2021-2023 legislative session (with $510,000 approved at the August 12, 2021 SWC meeting and $47.49 million approved at October 14, 2021 SWC Meeting – see attached most recent cost-share application).
    c. $25.9 million in local funding agreements for financing at the local level.
3. **Loan Funding Requested:** The Garrison Diversion Conservancy District is requesting a ***$18,215,000 loan*** at this time, from the Water

Our mission is to provide a reliable, high quality and affordable water supply to benefit the people of North Dakota.

4. Infrastructure Revolving Loan Fund. Proceeds of the loan will be used for a portion of the 25% local cost-share of the RRVWSP.
5. **Other Funding Sources:** $4.21 million in Garrison Diversion reserve funds and previously approved 75% cost-share from the Resources Trust Fund totaling $67.275 million for this request (see attached memo from BND for a more complete breakdown of funding sources and uses).
6. **Benefit of the Project to the State and Service Area:** The RRVWSP will provide an emergency water supply to central and eastern North Dakota during times of water scarcity to protect public health, ensure ongoing economic vitality, and provide for environmental benefits in the river systems throughout the project service area.

As noted under item No. 4 and per the requirements of H.B. 1431, Garrison Diversion has been in consultation with BND regarding their standard application process and policy regarding our loan request. Upon approval of loan eligibility from the SWC, Garrison Diversion will work with BND through their formal review and loan underwriting process.

Financing through the WIRLF is an extremely important funding tool for the success of the RRVWSP and we sincerely appreciate your consideration of our request. If you should have any questions or require further information, please don't hesitate to contact me at duaned@gdcd.org or Merri Mooridian at merrim@gdcd.org or by phone at (701) 652-3194.

Sincerely,

Duane DeKrey
General Manager

Attachments

CC: Andrea Travnicek, Secretary, ND State Water Commission

BND
Bank of North Dakota

PO BOX 5509, 1200 Memorial Hwy.
Bismarck, ND 58506-5509

800.472.2166
800.366.6888 TTY
701.328.5600

bnd.nd.gov

TO: Governor Doug Burgum
Members of the State Water Commission

FROM: Kelvin Hullet, Bank of North Dakota

SUBJECT: Water Infrastructure Revolving Loan Fund Request
Red River Valley Water Supply

DATE: October 15, 2021

The Garrison Diversion Conservancey District (District) is requesting a $18,215,000 loan, with a 40-year repayment term, from the Water Infrastructure Revolving Loan Fund. Proceeds of the loan will be used for a portion of the 25% local cost share of the Red River Valley Water Supply project. The table below shows the estimated sources and uses of funding for the 2021-2023 biennium.

Sources			**Uses**		
WIRLF Loan	$18,215,000	20.3%	Intake Screen	$23,000,000	25.6%
DWR Cost Share	$67,275,000	75.0%	Land & Easements	$3,000,000	3.3%
Funds on Hand	$4,210,000	4.7%	Program Management	$2,400,000	2.7%
			Pipeline	$61,300,000	68.3%
Total	**$89,700,000**	**100%**	**Total**	**$89,700,000**	**100%**

The loan amount requested by the district is for the amount of local cost share, which is allocated to the Cities of Fargo and Grand Forks, based on their nomination percentage of the project. The remaining local cost share, for the small system nominations, will be paid using reserve funds of the District.

The Cities of Fargo and Grand Forks intend to execute a Financing Resolution stating they will reimburse the District for the required debt service over the requested loan term. Based on the financing resolution, the project has demonstrated debt service capacity for the amount being requested

This correspondence should not be considered approval of a loan. Following the recommendation of a loan amount from the Water Infrastructure Revolving Loan Fund by the State Water Commisison, the Bank of North Dakota (BND) will proceed with formally reviewing the loan in accordance with BND loan policy.

The Water Infrastructure Revolving Loan Fund currently has $25,722,105.53 of capacity available for new loan commitments. An additional $40 million of liquidity may be provided to the Water Infrastructure Revolving Loan Fund by transferring loans, with a 30-year repayment term or less, to the Legacy Infrastructure Loan Fund.

DWR Date Received : 10/25/21

13635 - Garrison Diversion Infrastructure Loan for RRVWSP Local Cost Share

Application Details

Funding Opportunity:	9395-2021 Infrastructure Request
Funding Opportunity Due Date:	Dec 31, 2021 3:00 PM
Program Area:	Funding for Infrastructure in ND - FIND
Status:	Awarded
Stage:	Final Application
Initial Submit Date:	Jul 21, 2021 11:25 AM
Initially Submitted By:	Cindy Hewitt
Last Submit Date:	
Last Submitted By:	

Contact Information

Primary Contact Information

Active User*:	Yes
Type:	External User
Name:	Salutation Cindy L Hewitt First Name Middle Name Last Name
Title:	Accounting Specialist
Email*:	cindyh@gdcd.org
Address*:	401 Hwy 281 NE
	Carrington North Dakota 58421 City State/Province Postal Code/Zip
Phone*:	701-652-3194 Ext. Phone ###-###-####
Fax:	701-652-3195 ###-###-####
Comments:	

Organization Information

Status*:	Approved
Name*:	Garrison Diversion Conservancy District
Organization Type*:	Political Subdivision
Tax Id:	456004929

Organization Website:	http://www.garrisondiv.org
Address*:	401 Hwy 281 NE
	Carrington North Dakota 58421-0140 City State/Province Postal Code/Zip
Phone*:	(701) 650-6194 Ext. ###-###-####
Fax:	(701) 652-3195 ###-###-####
Benefactor:	
Vendor ID:	
PeopleSoft Supplier ID:	
Comments:	
Location Code:	
SAM.gov Entity ID:	176141000
SAM.gov Name:	Garrison Diversion Conservancy District
SAM.gov Entity ID Expiration Date:	04/22/2022
State Issued ID:	
Category #:	
Year Begin:	
Year Closed:	
NCES#:	
Restricted Indirect Cost Rate:	0.0%
Unrestricted Indirect Cost Rate:	0.0%

Infrastructure Funding Request

Infrastructure Funding Request

Project, Program, or Study Name*:	RRVWSP Local Infrastructure
Sponsor(s)*:	Garrison Diversion Conservancy District
County*:	Foster
City*:	Carrington
Description of Request*:	New
If Study, What Type:	
If Project/Program, What Type:	Rural Water Supply

Jurisdictions/Stakeholders Involved*:

Agassiz Water UD, Barnes Rural WD, Carrington, Central Plains WD, Cooperstown, Dakota Rural WD, Devils Lake, Fargo, Forman, Grafton, Grand Forks, Grand Forks Traill WD, Greater Ramsey WD, Hannaford, Hillsboro, Langdon, Larimore, Lisbon, Mayville, McLean Sheridan Rural Water, McVille, North East Regional WD, Park River, Richland County IPA, South Central Regional WD, Southeast Water UD, Stutsman Rural WD, Jamestown, Traill Rural WD, Tri-County WD, Tuttle, Valley City, Wahpeton, Walsh Rural WD

Specific Needs Addressed By the Project, Program or Study*:

Dozens of water systems throughout eastern North Dakota (ND) draw their water from the Red River and its tributaries which has been vulnerable to severe drought conditions. Additionally, long-term ground water supplies throughout the project service area are limited in their ability to serve long-term growth and industrial development. The RRVWSP is intended to provide emergency water supply to approx. 50 percent of ND's population by delivering Missouri River water to cites and water systems.

Description of Problem or Need and How Project Addresses that Problem or Need.

Description of Problem*:

Lack of water during drought periods and industrial development.

This project is designed to intake water from the Missouri River, provide treatment and utilize a combination of pumping and gravity to convey water to a discharge structure on the Sheyenne River. Lake Ashtabula will be used as a regulating reservoir for downstream users. The project uses infrastructure throughout the project area to create an efficient method to convey water to hundreds of thousands of residents in ND.

For this project,

Choose City, County or Water District*:	City
What is the Current Estimated Population?*:	376269

For this project,

What is the Benefited Population?*:	376269
Has Feasibility Study Been Completed?*:	Yes
Has Engineering Design Been Completed?*:	Ongoing
Have Assessment Districts Been Formed?*:	N/A
Have Land or Easements Been Acquired?*:	Ongoing
Has Sediment Analysis For Reconstruction Of An Existing Drain Been Completed?*:	N/A
Extraterritorial Jurisdiction?*:	No
Have You Applied For Any Federal Permits?*:	Yes

If Yes, Please Explain (include type/number):

US Army Corps of Engineers-Nationwide Permit 12

Have You Been approved for any Federal Permits?:	Yes

If Yes, Please Explain (include type/number):

US Army Corps of Engineers-Nationwide Permit 12

Have You Applied for any State Permits?*: Yes

If Yes, Please Explain (include type/number):

Sovereign Lands Permit
Water Appropriations Permit
Highway Permit
NDPDES Permit

Have You Been Approved for any State Permits?: Yes

If Yes, Please Explain (include type/number):

Sovereign Lands Permit-Office of State Engineer- S-2083-Rec'd June 2019
Water Appropriations Permit-Office of the State Engineer-Permit 1416A-Rec'd April 2019
Highway Permit-Permit for crossing US 52/US281-Tracking Number 3-052-224.4542-Rec'd May 2020
NDPDES Permit-DEQ-Received August 2020-Permit No.ND0026964

Have You Applied for any Local Permits?*: Yes

If Yes, Please Explain (include type/number):

McLean County Building Permit

Have You Been Approved For Any Local Permits?: Yes

If Yes, Please Explain (include type/number):

McLean County Building Permit

Briefly explain the level of review the Project/Program/Study has undergone.

Level Review*:

This project has been proceeding as a State/Local sponsored project with design elements being reviewed and approved for by project engineers.
All design elements are reviewed by Garrison Diversion and Lake Agassiz Water Authority technical advisory committee.
Vogel Law Firm the attorney for the RRVWSP reviews contracts, land owner agreements, etc.
All funding is approved by the North Dakota State Water Commission for their 75% cost share on the project.

Do You Expect Any Obstacles To Implementation (i.e. problems with land acquisition, permits, funding, local opposition, environmental concerns, etc.)?

Obstacles*: Yes

If Yes, Please Explain:

There isn't any legal action against the State/Local Project. There is a lawsuit by the State of Missouri regarding an option to purchase water from the federal government through the McClusky Canal. This lawsuit does not affect the state project.

Land acquisition is still ongoing for the full project extent, but is on track and no serious obstacles are expected.

Have you received, or do you anticipate receiving federal funding?

Federal Funding*: No

Implementation Timelines

Study*: 00/2007
Month/Year

Design*: 00/0000
Month/Year

Bid*: 10/2020
Month/Year

Construction Start*: 12/2020
Month/Year

Construction Completion*: 12/2031
Month/Year (00/0000)

Explain Additional Timeline Issues*:

The project is a a cost share project with 75% of funding from the State of North Dakota through the State Water Commission and 25% cost share for the local participants of the project. This loan is for the 25% local cost share. Project contracts are awarded as funding from the state is approved. The total timeline of the project will be determined by the timing of the state funds.

Certification

Submitted by*: Cindy Hewitt 07/21/2021
First Name Last Name Date

Address*: 401 Hwy 281 NE
Address Line 1

PO Box 140
Address Line 2

Carrington North Dakota 58421-0140
City State Zip Code

Telephone Number*: 701-652-3194

Sponsor Email*: merrim@gdcd.org

Consulting Engineer*: Black & Veatch

Engineer Telephone Number*: 708-203-3579

Engineer Email*: BoersmaPM@bv.com

This section needs to be completed by the project sponsor.
I certify that, to the best of my knowledge, the provided information is true and accurate.

Certify*: Yes

Authorized Individual*: Cindy Hewitt 07/21/2021
First Name Last Name Date

Documentation

Documentation

Project Specific Map
(Including an inset map of location within state.)
CLICK HERE **to see examples.**

Project Specific Map*: RRVWSP Project User Maps.pdf

Are You Seeking Department of Water Resources Cost-Share?*: No

Engineer's Estimate of Probable Cost: GDCD Red River Vally Water Supply Project Costs.pdf

CLICK HERE **for SFN 61801 Detailed Project Costs.**

Detailed Project Costs SFN 61801:

Water Supply Projects?:

CLICK HERE **for Life Cycle Cost Analysis Instructions.**

Life Cycle Cost Analysis:

CLICK HERE **for Capital Improvement Plan Instructions.**

Capital Improvement Plan SFN 61938:

Rural Flood Control?:

Approved Drainage Permit:

Results Of Positive Assessment Vote:

Drain Reconstructions?:

Sediment Analysis:

Flood Recovery Property Acquisition?:

Acquisition Plan:

Proof of HMGP Funding Ineligibility:

Community Flood Control, Rural Flood Control, Bank Stabilization, or Snag & Clear Project With Total Cost of $200,000 or More?:

CLICK HERE for Economic Analysis Details.

Economic Analysis:

Feasibility/Engineering Study for the Proposed Project:

Applicable Material:

Sources

Funding Amount Requested

State FY1	State FY2	Beyond State FY1	Total Cost	Source	Type	Term	Interest Rate
$9,107,500.00	$9,107,500.00	$0.00	$18,215,000.00	BND Infrastructure Revolving Loan Fund			
$9,107,500.00	**$9,107,500.00**	**$0.00**	**$18,215,000.00**				

Other Funding Sources

Type	Source	Grant or Loan	State FY1	State FY2	Beyond State FY2	Total Other Sources
State	State/SWC	Grant	$33,637,500.00	$33,637,500.00	$0.00	$67,275,000.00
Other	Funds on Hand	N/A	$2,105,000.00	$2,105,000.00	$0.00	$4,210,000.00
			$35,742,500.00	**$35,742,500.00**	**$0.00**	**$71,485,000.00**

Project Total

Current Requested Amount:	$18,215,000.00
Other Funding Sources:	$71,485,000.00
Total Project:	$89,700,000.00

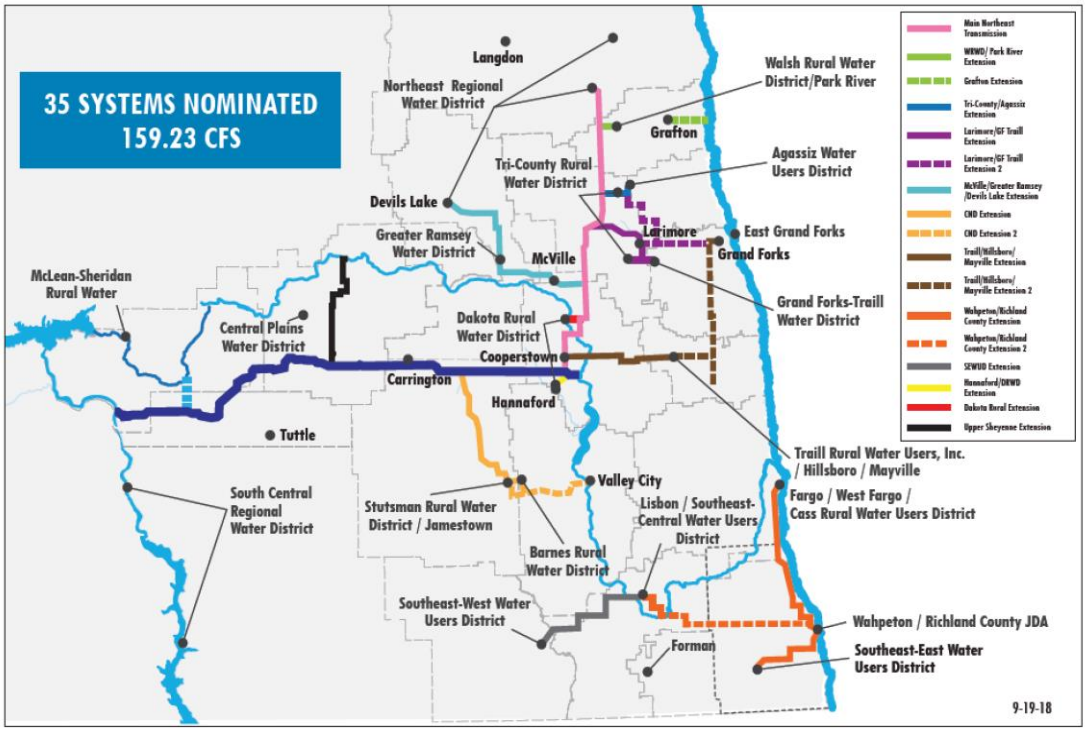
Project Costs

GDCD Red River Valley Water Supply Project				
BND Loan Budget Sheet				
Cost Classification	Total	Applicable Local Cost-Share	State (SWC)	Local (BND)
Intake Screen	$23,000,000	25%	$17,250,000	$5,750,000
Land & Easements	$3,000,000	25%	$2,250,000	$750,000
Program Management	$2,400,000	25%	$1,800,000	$600,000
Pipeline	$61,300,000	25%	$45,975,000	$15,325,000
Total	$89,700,000		$67,275,000	$22,425,000

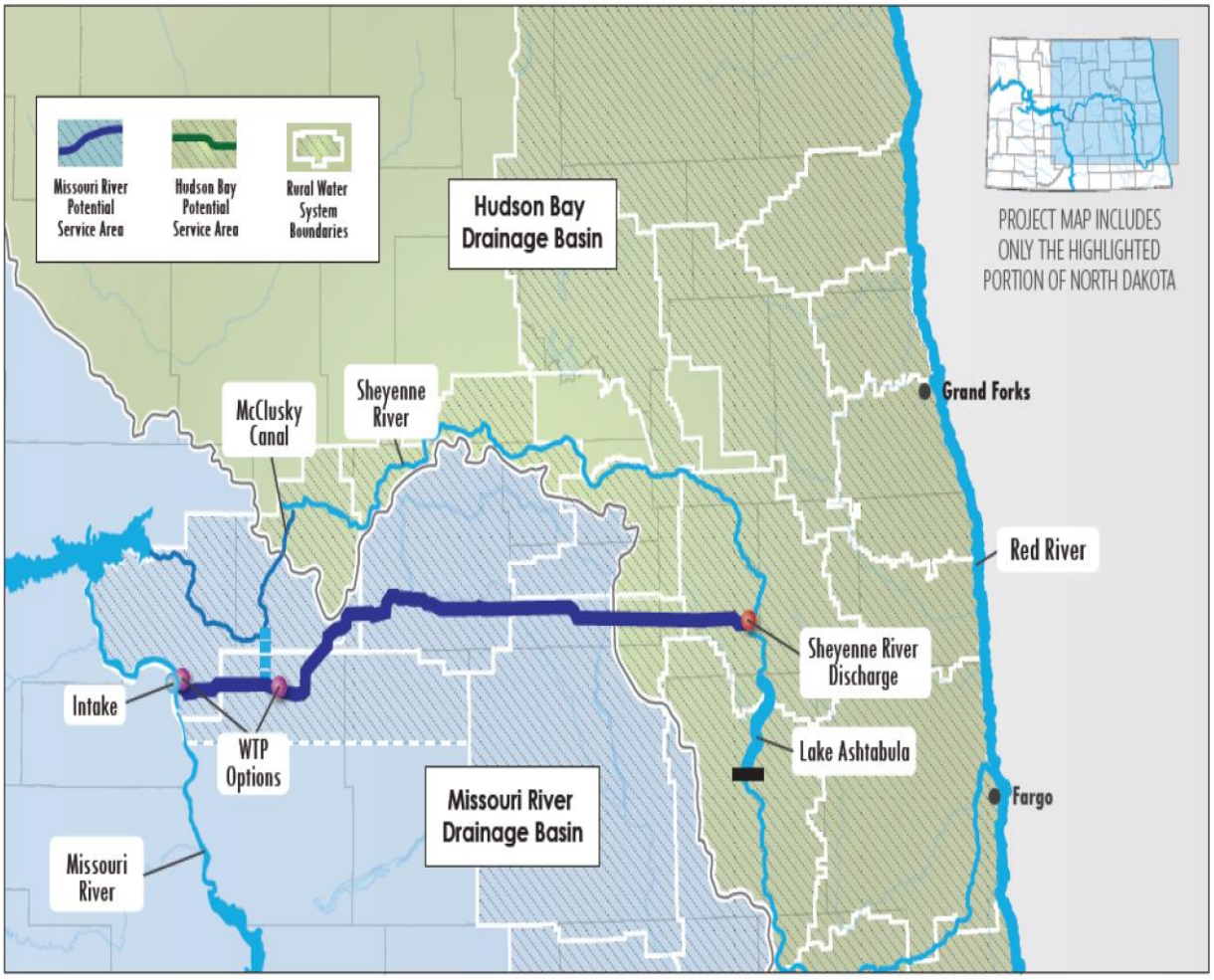
Funds on Hand $ 4,210,000

Water Infrastructure Revoling Loan Fund $18,215,000

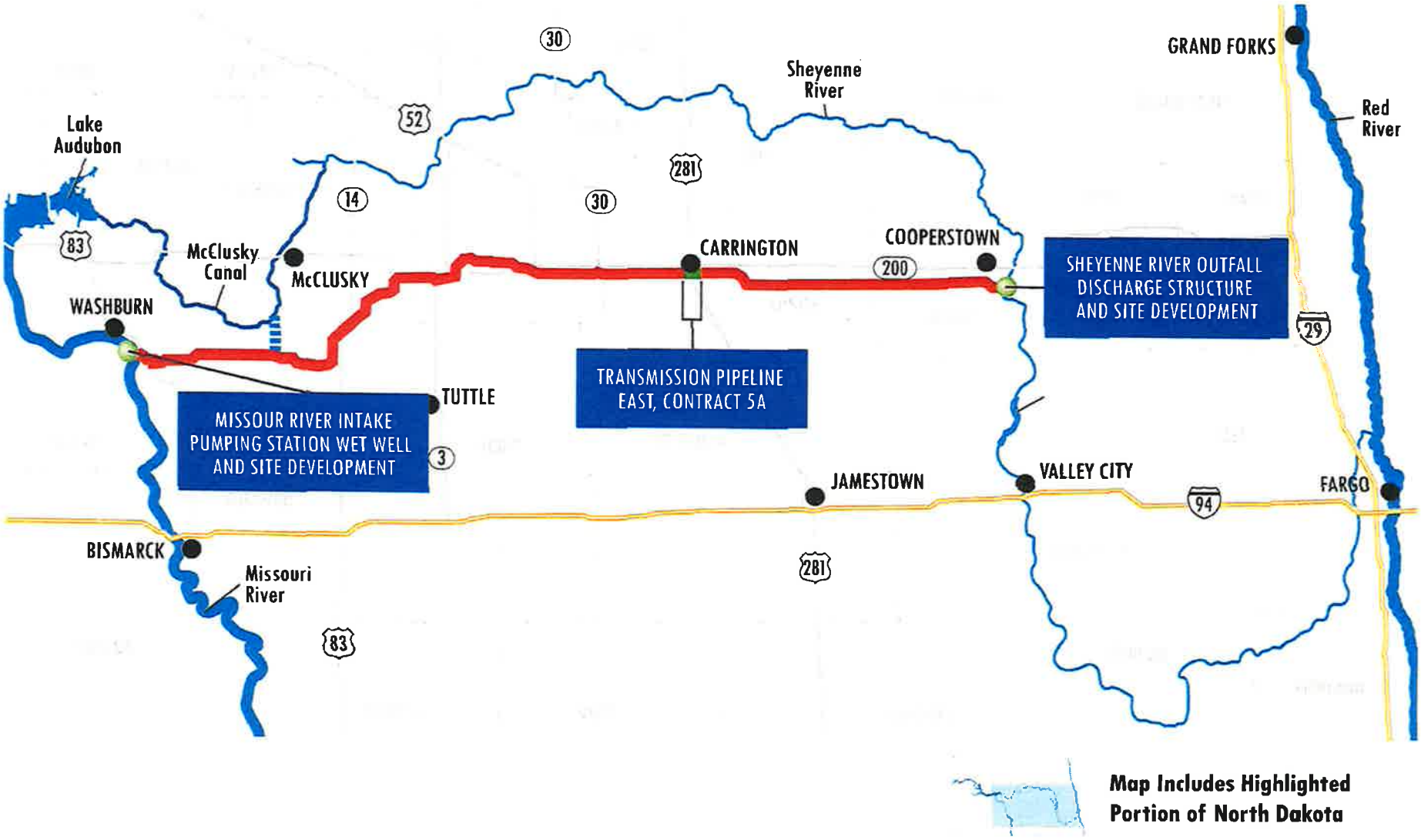
RRVWSP Project Users Map



RRVWSP Project Overview Map

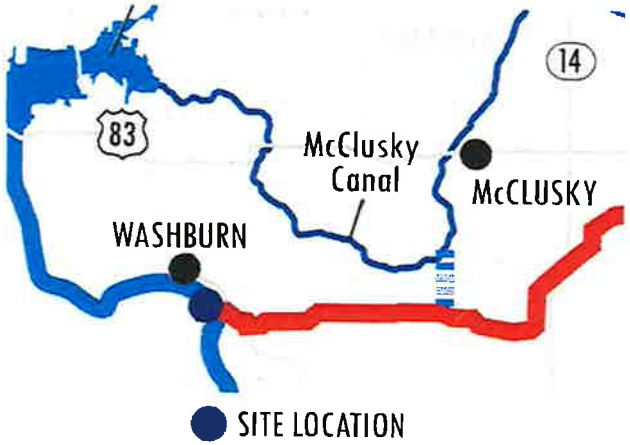


FUTURE 167-MILE PIPELINE



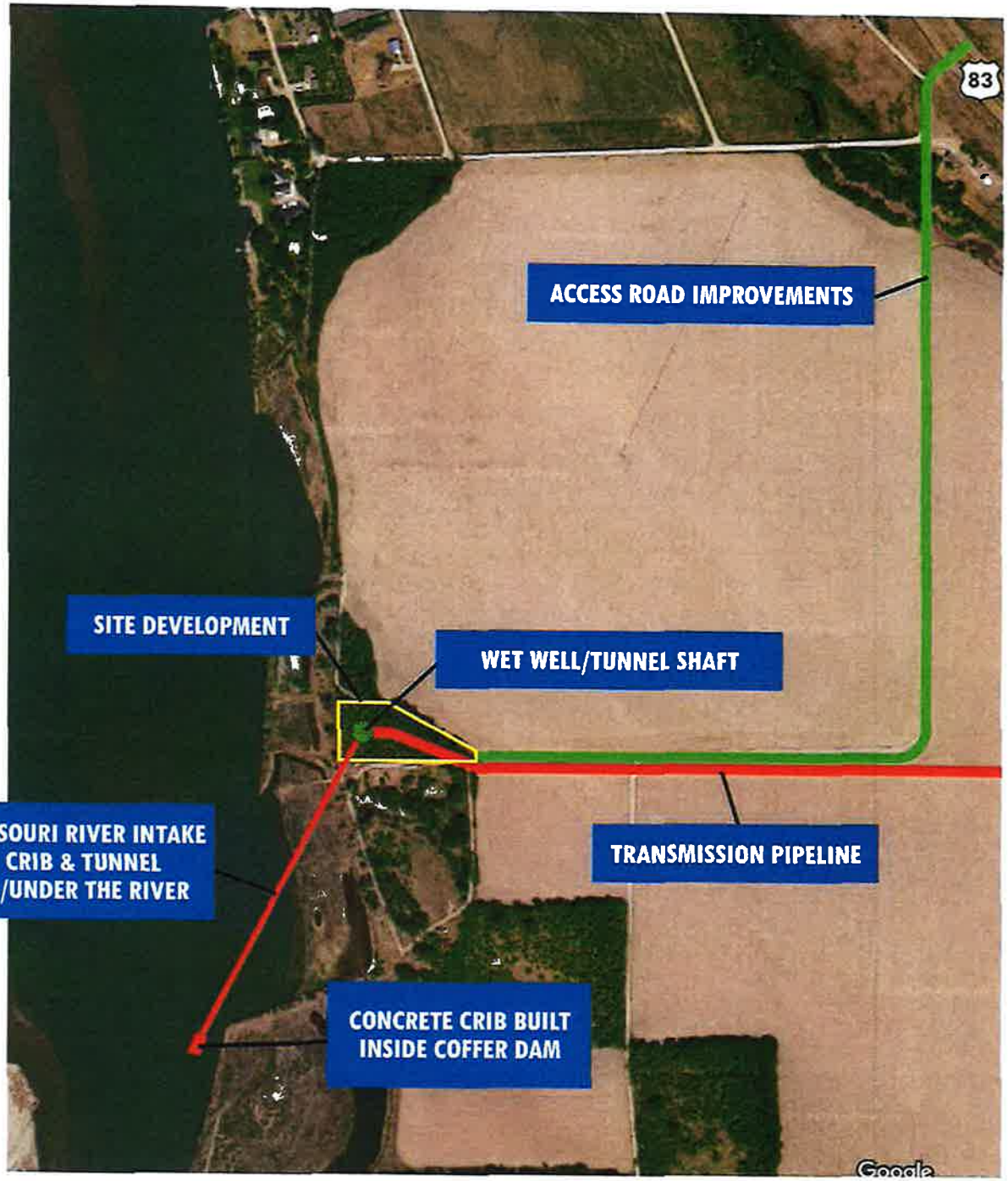
Map Includes Highlighted Portion of North Dakota

MISSOURI RIVER INTAKE PUMPING STATION

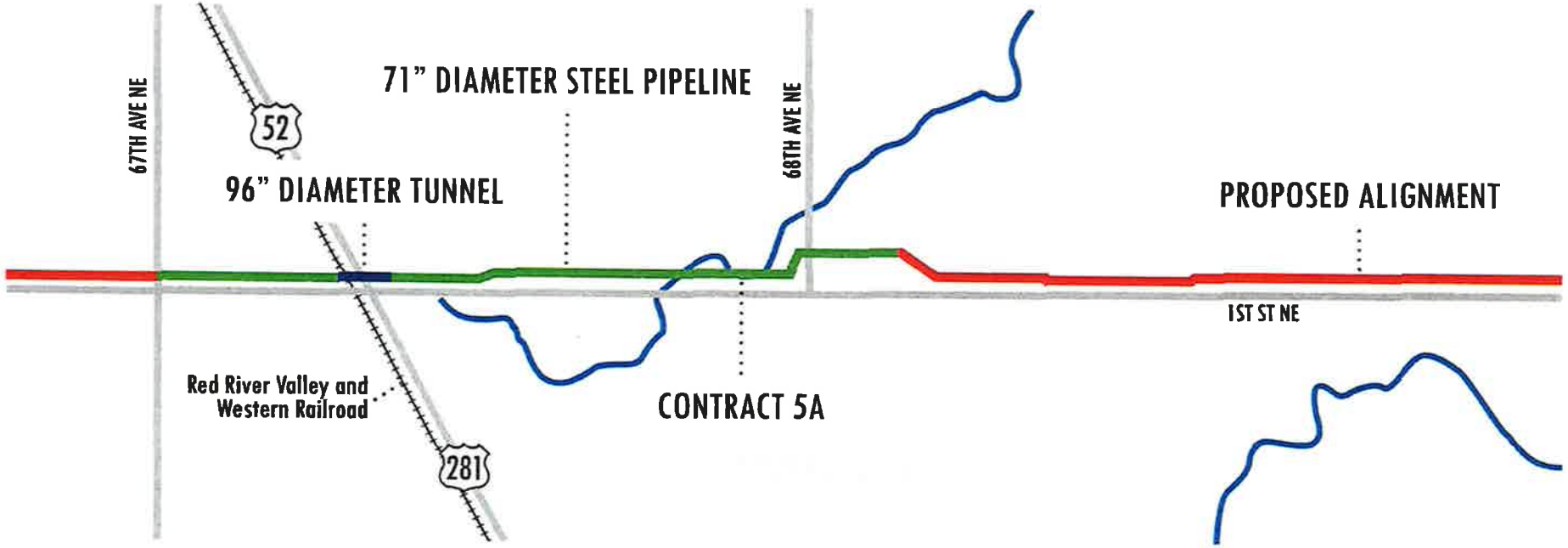


WET WELL & ROAD CONSTRUCTION

FUTURE CONSTRUCTION CONTRACTS



TRANSMISSION PIPELINE EAST
CONTRACT 5A



SHEYENNE RIVER OUTFALL

DISCHARGE STRUCTURE CONSTRUCTION

FUTURE CONSTRUCTION CONTRACTS

H2

NORTH Dakota | Water Resources

Be Legendary.

DWR Date Received : 10/26/21

WATER RESOURCES COST-SHARE APPLICATION CHECKLIST

(This checklist must be attached to all applications for Water Resources cost-share assistance.)

Project sponsors requesting cost-share assistance from the North Dakota Department of Water Resources (DWR) are required to submit completed applications, including all supplemental materials, at least 45 days in advance of meetings. Incomplete applications or those submitted after the 45 day deadline will not appear on the next Water Commission meeting agenda. Project sponsors, or their authorized representative, must verify that the following information is included as part of their application package for cost-share assistance.

Project Name:	Sponsoring Entity:
WAWSA-MCWRD System I North Expansion	Western Area Water Supply

Initial If Included, or "X" If Not	DWR Cost-Share Application Materials ***Required For All Applications**
TM	*Cost-Share Application Form (SFN 60439)
TM	*Project Specific Map (Including an Inset Map of Location within State.) See Examples
TM	*Detailed Project Costs SFN 61801 (Submit Fillable Worksheet)
X	Approved Drainage Permit (Rural Flood Control Only)
X	Results Of Positive Assessment Vote (Rural Flood Control Only)[1]
X	Sediment Analysis (Drain Reconstruction Only)
X	Acquisition Plan (Flood Recovery Property Acquisition Program Only)
X	Proof of HMGP Funding Ineligibility (Flood Recovery Property Acquisition Program Only)
X	Plans & Specifications For Bidding Project Construction (Request for Construction Cost-Share Only)
X	Economic Analysis Worksheet (Flood Control or Water Conveyance Construction & Total Cost > $200,000)
TM	Life Cycle Cost Analysis Worksheet (Water Supply Only)
TM	Capital Improvement Plan SFN 61938 (Water Supply Only)

[1] *A pre-application process is allowed for assessment projects. (See Project Funding Policy, Procedure, and General Requirements)*

I hereby certify that the information contained in this application for cost-share assistance is true and accurate, and all required materials have been provided with this application. I have read and understand the requirements for a completed application, and further understand that the submission of an incomplete application package will not be considered by the Water Commission for cost-share assistance.

Tami Madsen	Tami Madsen	10/25/2021
Project Sponsor (Printed Name)	Project Sponsor (Signature)	Date

PLEASE NOTE

The cost-share application (SFN 60439); Life Cycle Cost Analysis Worksheet; Economic Analysis Worksheet; Project Funding Policy, Procedure, and General Requirements; and future meeting dates are available via the Water Resources website at dwr.nd.gov. If you have questions, please call 701-328-4989 or email dwrcostshare@nd.gov.

DWR Date Received : 10/26/21

WESTERN AREA
WATER SUPPLY AUTHORITY

October 25, 2021

Ms. Andrea Travnicek, Ph. D., Director
North Dakota Department of Water Resources
900 E Boulevard Ave #770
Bismarck ND 58505-0850

Re: Western Area Water Supply Authority (WAWSA)
MCWRD 2021 System I North Expansion
Construction Cost Share Request for 2021-2023 Biennium

Dear Ms. Travnicek:

Over the past decade, WAWSA and its member entities have successfully used North Dakota Department of Water Resources (DWR) cost share funding to bring rural water service to over 2,000 new rural customers. Building on this success, the McKenzie County Water Resource District 2021 System I North Expansion Project will include water service to 61 residential customers, 1 bulk service to a man camp, 1 bulk service to a mobile home park serving 25 homes and a tie back to Watford City to feed their low-pressure zone from the City's high-pressure zone.

The preconstruction phase was funded by MCWRD. The construction phase project costs for this project are estimated at $3,166,273.00 as provided in the detailed cost estimate. **Currently, WAWSA is requesting approval of 75 percent of eligible project costs (including 10 percent contingency) estimated at $2,340,955 for this project.**

Thank you very much for your assistance with this important project for northwest North Dakota. If you have any questions, please do not hesitate to contact me at 701-774-3060 or Cory Chorne with Advanced Engineering and Environmental Services, Inc. at 701-221-0530.

Respectfully submitted,

Tami Madsen

Tami Madsen, Executive Director
WAWSA

COST-SHARE REQUEST

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING DIVISION
SFN 60439 (8/2021)

This form is to be filled out by the project or program sponsor with Water Resources staff assistance as needed. Applications for cost-share are accepted at any time. However, applications received less than 45 days before a Water Commission meeting will be held for consideration at the next scheduled meeting.

Please answer the following questions as completely as possible. Supporting documents such as maps, detailed cost estimates, and engineering reports should be attached to this form. If additional space is required, please use extra sheets as necessary.

For information regarding cost-share program eligibility see the *Water Commission Cost-Share Policy, Procedure, and General Requirements* – available upon request or at www.dwr.nd.gov.

Project, Program, Or Study Name
WAWSA - MCWRD System I North Expansion

Sponsor(s)
Western Area Water Supply Authority

County	City	Township/Range/Section
McKenzie County	Watford City	Varies

Request Type ☒ New ☐ Updated (previously submitted)

Description Type ☐ Pre-Construction ☒ Construction

If Study, What Type ☐ Water Supply ☐ Hydrologic ☐ Floodplain Mgmt. ☐ Feasibility ☐ Other

If Project/Program

☐ Bank Stabilization	☐ Irrigation	☐ Recreation	☐ Snagging & Clearing
☐ Dam Safety/EAP	☐ Multi-Purpose	☐ Ring Dike Program	☐ Water Retention
☐ FEMA Levee Program	☐ Municipal Water Supply	☐ Rural Flood Control	
☐ Flood Protection Program	☐ Property Acquisition Program	☒ Rural Water Supply	

Jurisdictions/Stakeholders Involved In This Project
Western Area Water Supply Authority, City of Williston, McKenzie County Water Resource District, Northwest Rural Water District, R&T Water District, BDW Rural Water

Description Of Problem Or Need And How The Project Provides A Solution
Continued expansion of the WAWSA rural distribution system in north central McKenzie County, north of Watford City, to provide rural residents with potable water service.

Level Of Study Completed

Describe Potential Obstacles To Implementation

Land Acquisition
Easements acquisition underway

Permits
None.

Funding
McKenzie County, through McKenzie County Water Resource District, funding match requested grant funding

Local Opposition
None

Environmental Concerns
None

Other

Funding Timeline (Carefully consider when DWR cost-share will be needed.)

Source	Total Cost	2021-2023 7/1/21-6/30/23	2023-2025 7/1/23-6/30/25	Beyond 7/1/25
Federal	$0.00	$	$	$
Water Resources	$2,341,000.00	$2,341,000.00	$	$
Other State	$0.00	$	$	$
Local	$825,273.00	$825,273.00	$	$
Total	$3,166,273.00	$3,166,273.00	$ 0.00	$ 0.00

Funding Detail (Provide names and amounts from all potential funding sources from the table above.)

Source	Amount	Grant Or Loan	Term	Interest
NDDWR	$ 2,341,000.00	Grant	NA	0 %
MCWRD	$ 825,273.00	Cash	NA	0 %
	$			%
	$			%

Explain Timelines For All Phases And Their Current Status
Plans and specifications under final 99% review for December bidding.

Study (Month/Year)	Design (Month/Year)	Bid (Month/Year)
April 2021	November 2021	December 2021

Construction Start (Month/Year)	Construction Completion (Month/Year)
April 2022	October 2023

Has Economic Analysis Been Completed?	☒ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Life Cycle Cost Analysis Been Completed?	☒ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Feasibility Study Been Completed?	☒ Yes	☐ No	☐ Ongoing	☐ Not Applicable
Has Engineering Design Been Completed?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable
Have Land Or Easements Been Acquired?	☐ Yes	☐ No	☒ Ongoing	☐ Not Applicable

Have Assessment Districts Been Formed? ☐ Yes ☐ No ☐ Ongoing ☒ Not Applicable — If Yes, (Date)?

Are Connections For New Rural Customers Located Within The Extra-Territorial Jurisdiction Of A Municipality? ☐ Yes ☐ No

Have You Applied For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Federal Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any State Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Have You Applied For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable
Have You Been Approved For Any Local Permits?	☐ Yes	☐ No	☒ Not Applicable

Type	Number

If Yes, Please Explain

Submitted By	Date
Tami Madsen	10/25/2021

Address	City	State	ZIP Code
1117 East Broadway	Williston	Nd	58802

Sponsor's Telephone Number	Sponsor's Email Address
701-774-6605	tami.madsen@wawsp.com
Engineer's Name	**Engineer's Telephone Number**
Cory Chorne	701-221-0530
Engineer's Company	**Engineer's Email Address**
Advanced Engineering and Environmental Services, Inc.	cory.chorne@ae2s.com

I Certify That, To The Best Of My Knowledge, The Provided Information Is True And Accurate.

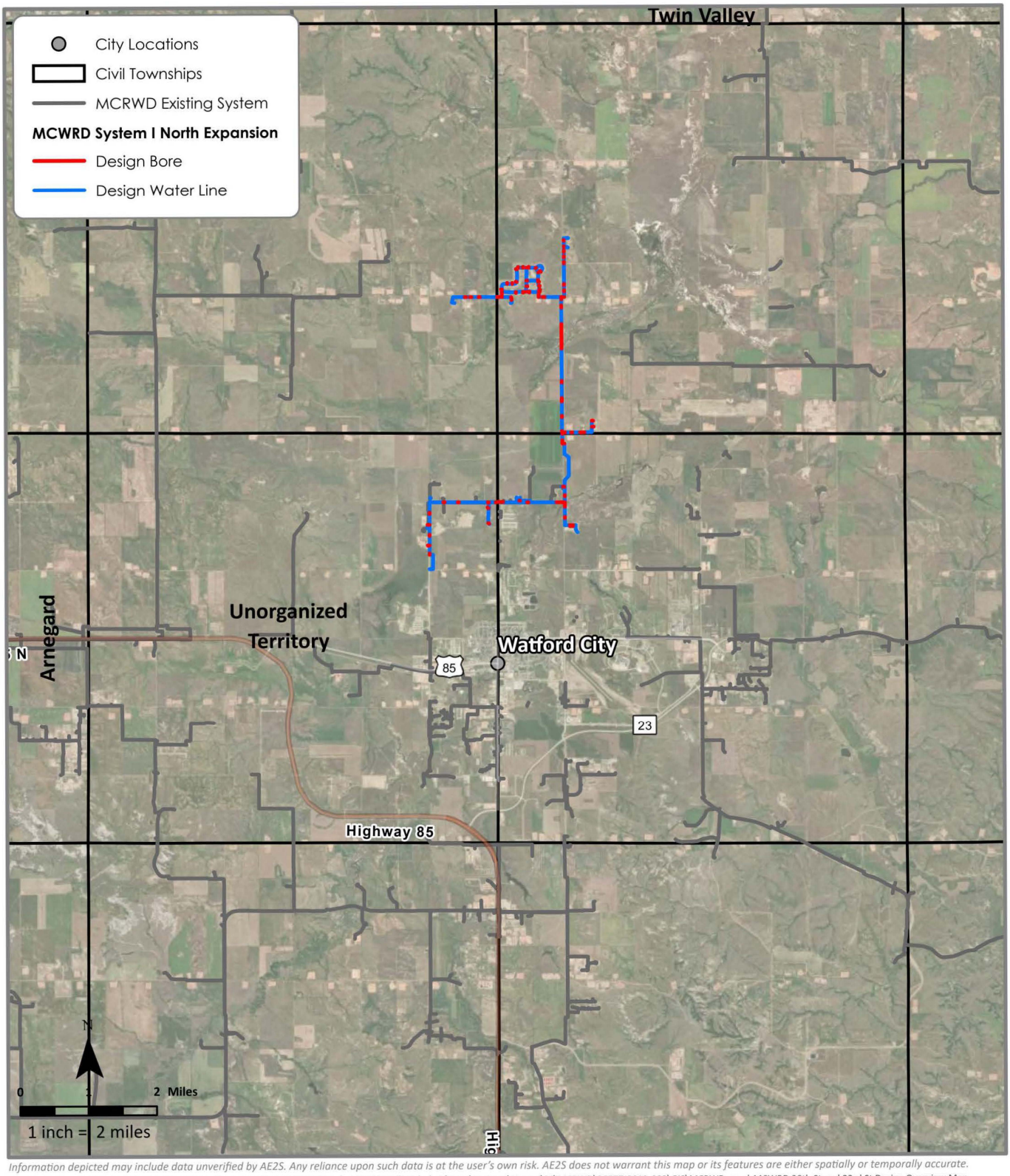
Signature	Date
Tami Madsen	10/25/2021

E-MAIL TO:
dwrcostshare@nd.gov

OR

Submit Via Email

www.ae2s.com | Advanced Engineering and Environmental Services, Inc.



Information depicted may include data unverified by AE2S. Any reliance upon such data is at the user's own risk. AE2S does not warrant this map or its features are either spatially or temporally accurate.

Coordinate System: NAD 1983 StatePlane North Dakota South FIPS 3302 Feet | Edited by: dlissick | C:\Data\Projects\Nasuni\M\MCRWD\00577-2012-002\GIS\MCRWD.aprx| MCWRD 30th St and 23rd St Design Overview Map

Locator Map Not to Scale

MCWRD SYSTEM I NORTH EXPANSION

MCRWD
Watford City | McKenzie County, ND

Date: 10/21/2021

DELINEATION OF COSTS
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING AND EDUCATION
SFN 61801 (10/2021)

DWR Date Received : October 26, 2021

Project:	WAWSA - MCWRD System 1 North Distribution
Sponsor:	Western Area Water Supply Authority
Contact:	Tami Madsen, Exectutive Director
Phone:	701-774-6605
Engineer:	Cory Chorne, Advanced Engineering and Environmental Services
Phone:	701-221-0530

Total Cost :	$ 3,166,273
Ineligible Cost :	$ 45,000
Eligible Cost :	$ 3,121,273
Local Cost :	$ 825,273

Date: October 19, 2021

Cost-Share $ $ 2,341,000

Preconstruction : $ -
Construction : $ 2,340,955

Project Type:	**Cost-share %**
Rural Water - Expansion/Improvement	75%

Item	%	Cost Classification	Quantities	Unit	Unit Price	Total	Cost-Share %	Cost-Share $ *
		Construction Costs						
1	4.7%	Mobilization	1	LS	125,000.00	$ 125,000	75%	$ 93,750
2	2.8%	Bonding / Insurance	1	LS	75,000.00	$ 75,000	75%	$ 56,250
3	2.8%	Water Main 2 in	10600	LF	7.00	$ 74,200	75%	$ 55,650
4	1.6%	Water Main 3 in	5100	LF	8.50	$ 43,350	75%	$ 32,513
5	1.0%	Water Main 4 in	2800	LF	10.00	$ 28,000	75%	$ 21,000
6	12.0%	Water Main 6 in	22300	LF	14.50	$ 323,350	75%	$ 242,513
7	6.1%	Water Main 8 in	9400	LF	17.50	$ 164,500	75%	$ 123,375
8	9.8%	Water Main 12 in	10500	LF	25.00	$ 262,500	75%	$ 196,875
9	15.9%	Boring - Poly	1	LS	426,800.00	$ 426,800	75%	$ 320,100
10	3.4%	Gate Valve	1	LS	91,150.00	$ 91,150	75%	$ 68,363
11	3.9%	Hydrant	13	EA	8,000.00	$ 104,000	75%	$ 78,000
12	6.7%	Fittings	1	LS	180,000.00	$ 180,000	75%	$ 135,000
13	9.4%	Meter - Frost Free	63	EA	4,000.00	$ 252,000	75%	$ 189,000
14	3.0%	Meter - Master	1	LS	80,000.00	$ 80,000	75%	$ 60,000
15	4.7%	Meter and Pressure Reducing Valve	1	LS	125,000.00	$ 125,000	75%	$ 93,750
16	1.9%	Detailed Tie-In	13	EA	4,000.00	$ 52,000	75%	$ 39,000
17	1.4%	Seeding	1	LS	36,580.00	$ 36,580	75%	$ 27,435
18	0.0%		0		-	$ -	75%	$ -
19	0.0%		0		-	$ -	75%	$ -
20	0.0%		0		-	$ -	75%	$ -
21	0.0%		0		-	$ -	75%	$ -
22	0.0%		0		-	$ -	75%	$ -
23	0.0%		0		-	$ -	75%	$ -
24	0.0%		0		-	$ -	75%	$ -
25	0.0%		0		-	$ -	75%	$ -
26	0.0%		0		-	$ -	75%	$ -
		Construction Sub-Total				$ 2,443,430	75%	$ 1,832,573
	10.0%	**Contingency**				$ 244,343	75%	$ 183,257
	84.9%	**Construction Total**				$ 2,687,773	75%	$ 2,015,830
		Preconstruction Costs						
27	0.0%	Preliminary Design	1	LS	-	$ -	75%	$ -
28	0.0%	Final Design	1	LS		$ -	75%	$ -
29	0.0%	Bidding / Negotiations	1	LS		$ -	75%	$ -
30	0.0%		0		-	$ -	75%	$ -
31	0.0%		0		-	$ -	75%	$ -
	0.0%	**Preconstruction Total**				$ -	75%	$ -
		Construction Engineering Costs						
32	1.7%	Construction Contract Management	1	LS	45,000.00	$ 45,000	75%	$ 33,750
33	10.6%	Project Inspection	1	LS	285,000.00	$ 285,000	75%	$ 213,750
34	1.0%	Post-Construction / Warranty	1	LS	27,500.00	$ 27,500	75%	$ 20,625
35	0.4%	I&C System Services	1	LS	10,000.00	$ 10,000	75%	$ 7,500
36	0.0%		0		-	$ -	75%	$ -
	11.6%	**Construction Engineering Total**				$ 367,500	3251250%	$ 275,625
		Other Eligible Costs						
37	0.0%	Ads for Construction	1	LS	1,000.00	$ 1,000	75%	$ 750
38	0.5%	Permit Fees	1	LS	15,000.00	$ 15,000	75%	$ 11,250
39	1.6%	Miscellaneous	1	LS	50,000.00	$ 50,000	75%	$ 37,500
40	0.0%		0		-	$ -	75%	$ -
41	0.0%		0		-	$ -	75%	$ -
	2.1%	**Other Eligible Total**				$ 66,000	75%	$ 49,500
		In-eligible Costs						
42	0.5%	Administrative	1	LS	15,000.00	$ 15,000	0%	$ -
43	0.3%	Legal Expenses	1	LS	10,000.00	$ 10,000	0%	$ -
44	0.6%	Easement	1	LS	20,000.00	$ 20,000	0%	$ -
45	0.0%		0		-	$ -	0%	$ -
	1.4%	**Other Ineligible Total**				$ 45,000	0%	$ -
	100.0%				**Total**	$ 3,166,273		
					Eligible Total	$ 3,121,273	75%	$ 2,340,955
					Federal or State Funds That Supplant Costs	$ -		
					Eligible Cost Total	$ 3,121,273	75%	$ 2,340,955

* The Cost-share estimate is purely for planning and informational purposes only and does not, in any way, guarantee a financial commitment to any degree, from the State Water Commission.

Life Cycle Cost Analysis Review

Sponsor: Western Area Water Supply Authority
Project Title: MCWRD System 1 North Rural Distribution **Date:** October 28, 2021

Explanation of Alternatives:

MCWRD System 1 North Rural Distribution - Preferred Alternative: Installation of 12 miles of rural transmission and distribution pipeline.

Alternative 2 - Do Nothing: This alternative would eliminate the construction of the proposed water service..

Inputs:

	MCWRD System 1 North Rural Distribution - Preferred Alternative	Alternative 2 - Do Nothing Alternative		
Users Served	63			
Construction Cost	$3,121,300	$0		
Annual O & M	$10,000	$0		

Details:

MCWRD System 1 North Rural Distribution - Preferred Alternative: This project involves installation of 12 miles of rural transmission and distribution pipeline to serve an initial count of 63 rural users north of Watford City. This project will connect to an existing 12-inch transmission main under Watford City ownership, as well as an update to an existing vault which will provide a tie-back to Watford City via a meter and pressure reducing valve. This tie-back will provide an emergency feed point for the north side of Watford City.

Alternative 2 - Do Nothing Alternative: This alternative would eliminate the construction of the proposed water service to the users that have signed up as part of this project and would eliminate an emergency tie-back to Watford City.

Model Function:

The economic model appears to have functioned properly. The results are deemed to be reliable and repeatable with the inputs provided by the project sponsor.

LCCA Model Results:

Scenario Analysis - Present Value Life Cycle Cost Summary

Present Value	MCWRD System 1 North Rural Distribution - Preferred Alternative	Alternative 2 - Do Nothing Alternative		
Capital Costs	$3,121,000	$0		
O&M	$281,000	$0		
Repair, Rehab, Replacement	$1,324,000	$0		
Salvage Value	$181,000	$0		
Total PVC	**$4,545,000**	**$0**		
PV Cost Per User	**$72,143**	**$0**		

Current Water Rate (Cost Per 5000g)		**$33**			
Comparable Water Rate		**$47**			
Total Municipal Service Users		63	63		
Cost-Share Percent		75%	75%		
	Local Share	$780,250	$0		
	Other Funding	$0	$0		
	Total Local	$780,250	$0		
Payment Per User With Cost-Share		**$62.65**	**$0.00**		
	Local Share	$3,121,000	$0		
	Other Funding	$0	$0		
	Total Local	$3,121,000	$0		
Payment Per User Without Cost-Share		**$250.61**	**$0.00**		

Explanation of Results:

The sponsor's preferred project is the WAWS System 1 North Rural Distribution. The present value cost of this alternative is $4,545,000, which is the only informed alternative. The present value cost per user for this alternative is $72,143. The monthly user cost of the local share with SWC cost-share at 75% participation is $62.65 per month compared to $250.61 without SWC cost-share participation.

CAPITAL IMPROVEMENT PLAN (CIP)
NORTH DAKOTA DEPARTMENT OF WATER RESOURCES
PLANNING AND EDUCATION DIVISION
SFN 61938 (7/2021)

System: Western Area Water Supply - MCWRD System I North Expansion
Date: 10/25/21

Population: 59,801
Users: 5

ASSET	UNITS	UNIT COST	QTY	RESERVE REPLACEMENT %	REPLACEMENT COST	AVERAGE LIFE (YRS)	ANNUAL RESERVE	MONTHLY RESERVE	MONTHLY RESERVE PER CUSTOMER
Existing Project CIP Costs									
Water Supply & Treatment	1	$67,644,480	1	50.00%	$33,822,240	50	$676,445	$56,370	$11,274
Transmission Pipelines	1	$76,679,176	1	50.00%	$38,339,588	75	$511,195	$42,600	$8,520
Pump Stations	1	$13,936,030	1	50.00%	$6,968,015	50	$139,360	$11,613	$2,323
Reservoirs	1	$14,196,872	1	50.00%	$7,098,436	50	$141,969	$11,831	$2,366
Rural Distribution	1	$89,950,400	1	50.00%	$44,975,200	75	$599,669	$49,972	$9,994
SUBTOTAL Existing CIP Costs					$131,203,479		$2,068,638	$172,386	$34,477.29
New Project CIP Costs									
MCWRD System I North	1	##########	1	50.00%	$1,221,715	75	$16,290	$1,357	$271.49
SUBTOTAL New CIP Costs					$1,221,715		$16,290	$1,357	$271.49
TOTAL Existing and New Project CIP					$132,425,194		$2,084,927	$173,744	$34,748.79

	TOTAL RESERVES	ANNUAL RESERVE	MONTHLY RESERVE	MONTHLY RESERVE PER CUSTOMER
Current:	$8,255,350	$1,770,000	$147,500.00	$29,500.00
Adjustment:	$124,169,844	$314,927	$26,244	$5,248.79

	Monthly Ave Gal/user	Monthly $/kgal
Required	n/a	n/a
Current	n/a	n/a
Adjustment	n/a	n/a

Report Prepared by (Title): Jeston McGruder, PE - Project Manager
Date: 10/25/21

Notes:Notes: The domestic rates charged by WAWSA are currently designed to cover all O&M associated with water production and delivery. For water sales to non-domestic commercial and industrial customers, the WAWSA receives a rate equal to the cost of production and delivery in the location in which the water is sold. This commercial and industrial rate revenue is used to fund capital reserves for the domestic system. This reserve and rate-setting approach has been taken by the WAWSA Board of Directors from 2011 to 2021, and the Board is aware that the addition of a capital reserve component to the domestic rates may be needed in the future. In 2020, WAWSA contributed $1.25M to its capital renewal/replacement reserves, which translates to approximately $0.44/1,000 gallons of domestic water sold. In 2019, WAWSA contributed $3.72M to its capital renewal/replacement reserves. For 2021, the targeted capital renewal/reserve contribution is $1.77M. WAWSA reviews the cost of domestic service on an annual basis evaluate the need for rate changes to reflect the actual costs of service and to evaluate the need for incorporating a capital reserve component into the domestic rate.

Instructions
1 - Fill in colored items
2 - Enter Existing asset project CIP costs
3 - Enter New asset project CIP costs
4 - Enter current total reserves and annual reserve

I1

DWR Date Received : 10/25/21

GARRISON DIVERSION
CONSERVANCY DISTRICT
P.O. BOX 140
CARRINGTON, N.D. 58421
(701) 652-3194
FAX (701) 652-3195
gdcd@gdcd.org
www.garrisondiversion.org

October 25, 2021

Governor Doug Burgum
Chairman – North Dakota State Water Commission
900 East Boulevard Avenue, Dept 770
Bismarck, ND 58505-0850

Dear Governor Burgum:

For many years, the Garrison Diversion Conservancy District (Garrison Diversion) pursued securing water from the McClusky Canal to serve eastern North Dakota in the federal Red River Valley Water Supply Project (RRVWSP). However, after the federal government failed to sign a Record of Decision (ROD) on the federal RRVWSP Environmental Impact Statement, we believed utilizing the McClusky Canal as a water source was no longer a possibility.

As Garrison Diversion advanced with a state RRVWSP, the Eastern North Dakota Alternate Water Supply (ENDAWS) was developed as a cost savings alternate water source for the state RRVWSP, using the McClusky Canal to supplement or replace the Missouri River as a water source. Recently, a ROD was received on ENDAWS, and utilizing the McClusky Canal is now a possibility.

Garrison Diversion, as a joint administrator and fiscal agent of the federal MR&I program, respectfully requests the additional FY20 funding of $650,000, made available this fall, be allocated for ENDAWS. The funding would allow Garrison Diversion to bring the pipeline design to 30 percent, verify landowners and initiate right-of-way acquisition for ENDAWS.

Your support is greatly appreciated as we work to advance ENDAWS.

Sincerely,

Duane DeKrey
General Manager

CC: Andrea Travnicek, Secretary, ND State Water Commission

Our mission is to provide a reliable, high quality and affordable water supply to benefit the people of North Dakota.

Eastern North Dakota Alternate Water Supply
White Paper

In large part, information hereafter was developed by the Bureau of Reclamation for documents related to the Red River Valley Water Supply Project (RRVWSP) and the Eastern North Dakota Alternate Water Supply (ENDAWS). The documents include the Final Environmental Impact Statement (EIS), the ENDAWS Project Volume 1, November 2020, documents, and Appendix A, Appraisal-level Design Engineering Report.

Red River Valley Water Supply Project

The State RRVWSP is a State and local project developed by the State of North Dakota and through the Garrison Diversion Conservancy District (Garrison Diversion). It is designed to meet the future municipal, rural, and industrial water needs for participating communities in central and eastern North Dakota. This is not a Federal project, nor does the Bureau of Reclamation (Reclamation) have a role in its development. The State RRVWSP provides 165 cubic feet per second (cfs) of water from the Missouri River to central and eastern North Dakota. Figure 1 shows the pipeline alignment and major hydraulic structures for the State RRVWSP. The capital cost of the RRVWSP is $1.2 Billion.

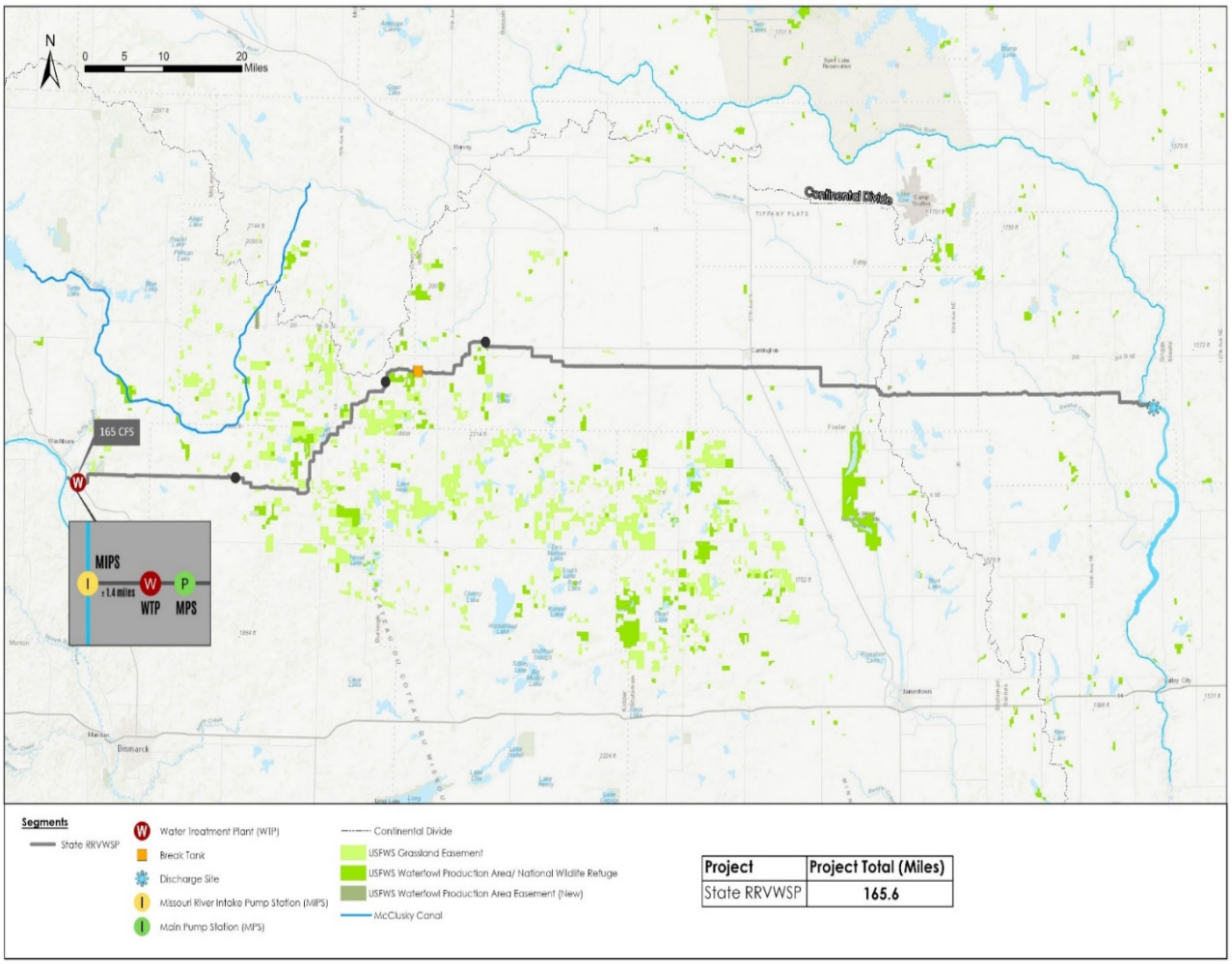
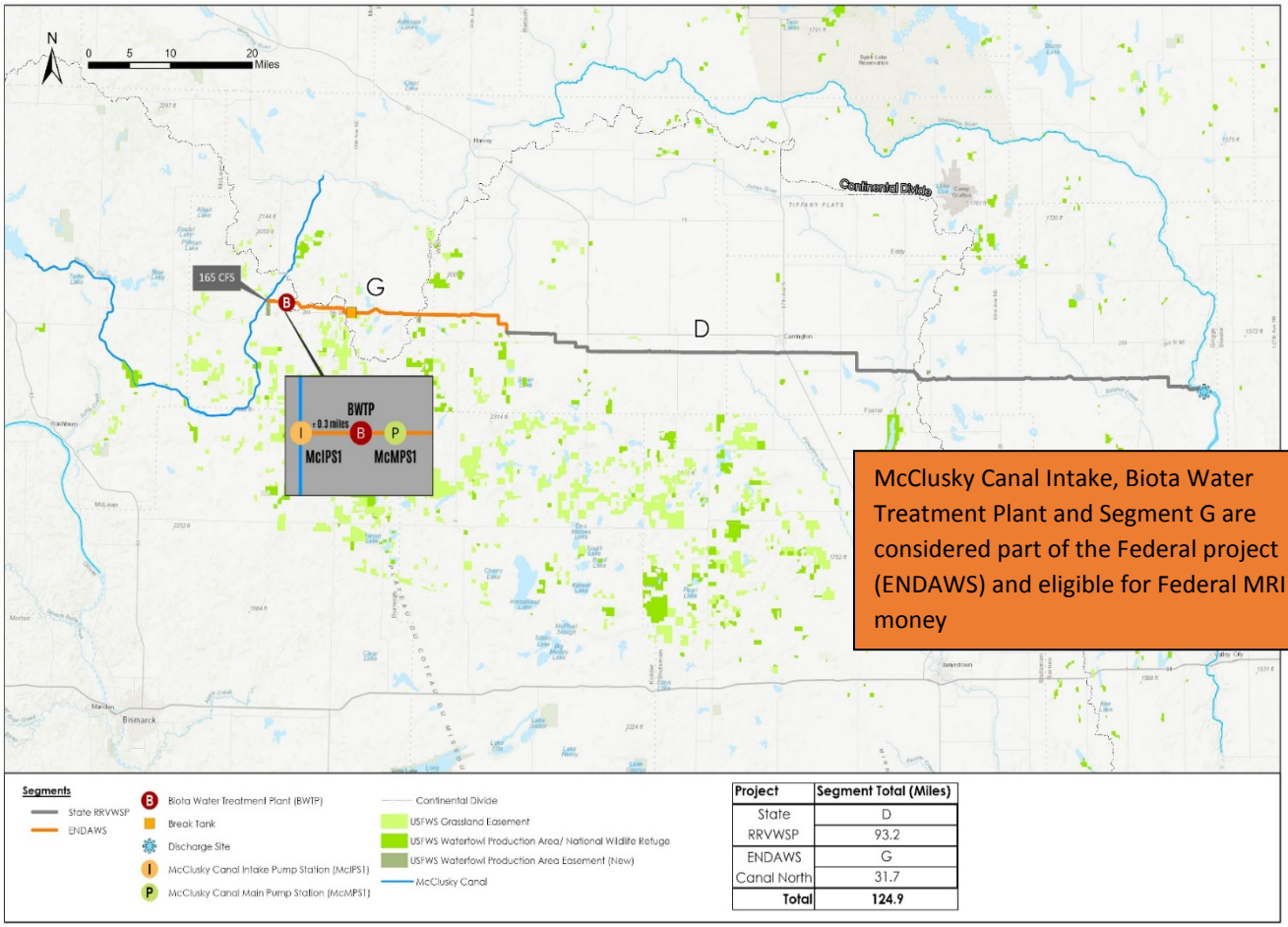


Figure 1 – The State Red River Valley Water Supply Project Layout

Eastern North Dakota Alternate Water Supply

ENDAWS was developed as a cost savings alternate water source for the State RRVWSP to use the McClusky Canal to supplement or replace the Missouri River. ENDAWS would provide an additional 145 cfs water service contract in addition to the 20 cfs water service contract previously subjected to Reclamation's environmental review in the CNDWSP for a total of 165 cfs. ENDAWS would include an intake on the McClusky Canal, a Biota Water Treatment Plant (BWTP), a pumping station and a pipeline, which would terminate where it intersects with the State RRVWSP pipeline. The features of ENDAWS are shown in color in Figure 2. ENDAWS has been approved as a project by the Federal government through a Record of Decision.



Project	Segment Total (Miles)
State	D
RRVWSP	93.2
ENDAWS	G
Canal North	31.7
Total	**124.9**

Figure 2 – The ENDAWS Alternative to the RRVWSP

Cost Savings of the ENDAWS Alternative

As shown in Table 1, the capital cost for the ENDAWS alternative is $823,000,000. The cost savings could be larger because some project elements of the ENDAWS alternative are eligible for federal funding. The ENDAWS alternative is less because of the approximately 40 less miles of transmission pipeline. The alternative also offers about $3-$4 million of annual O&M savings because the there is less elevation difference to pump from the McClusky Canal to the Sheyenne River.

Table 1 -- ENDAWS Route Option McClusky Canal North Estimated Cost Summary

	Size	Capital Cost
Federal Components		
McIPS1	165 cfs/2,000 HP	$28,246,000
McMPS1	165 cfs/20,000 HP	$34,545,000
Pipeline Seg. G	72-inch	$189,735,000
Subtotal		$252,526,000
Common Components		
HBT	10 MG	$16,461,000
CVS & Discharge Structure	140 cfs	$9,963,000
Pipeline Seg. D	72-inch	$544,020,000
Subtotal		**$570,444,000**
Totals(1)		**$823,000,000**

Schedule

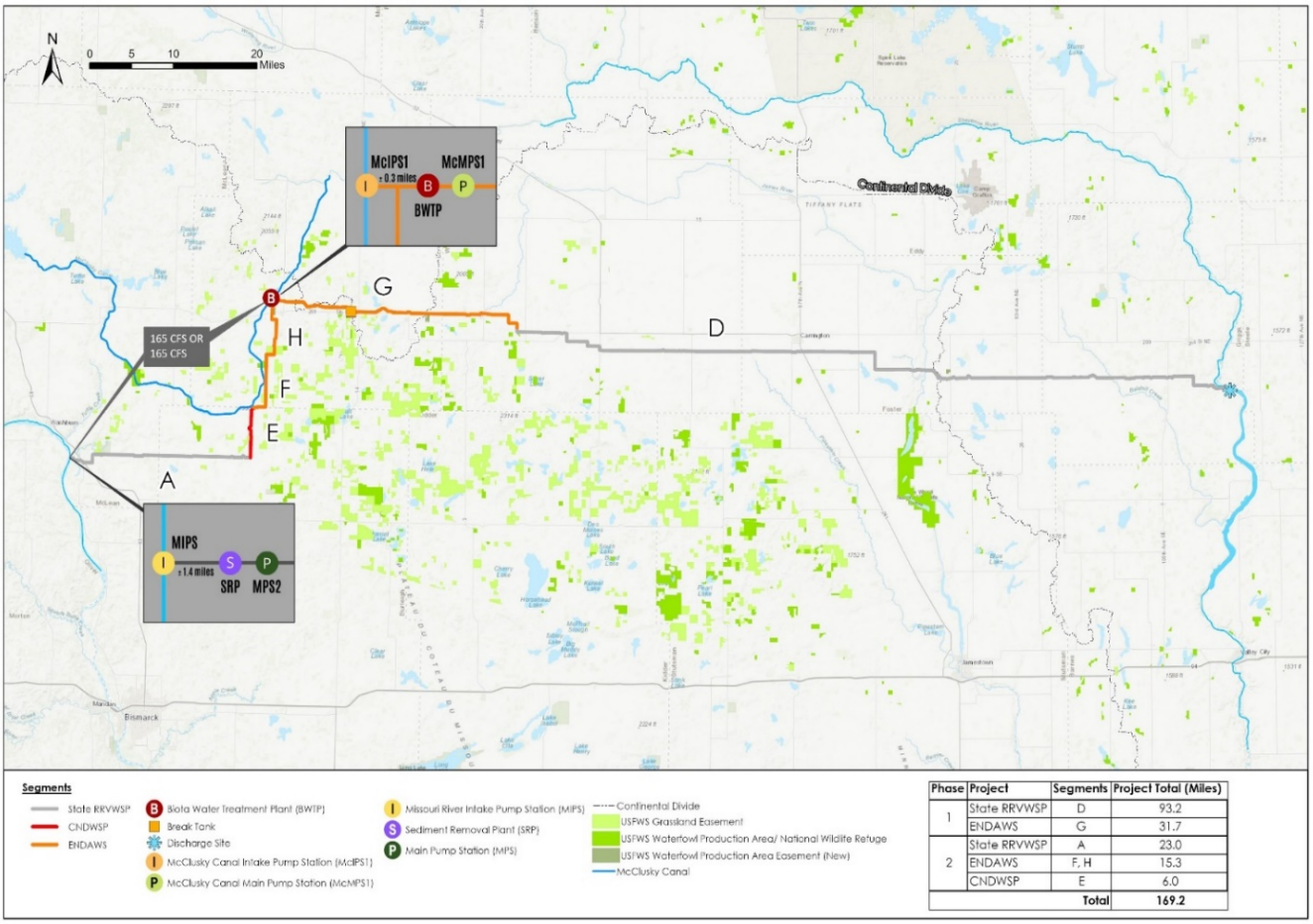
2022 - Pipeline design to 30%, verify landowners and start acquiring right-of-way

2023 - Intake design, biota water treatment design and continue acquiring right-of-way

2024 - Finalize pipeline design and initiate construction

Two Intakes- After the release of the Final Environmental Impact Statement in 2007, Reclamation would not sign the Record of Decision on the federal RRVWSP. By 2011, Garrison Diversion, Lake Agassiz Water Authority and other stakeholders determined a state supported project would move forward. At that point, the intake location was moved to the Missouri River near Washburn.

The ENDAWS project was envisioned as a way to provide an additional intake option to the state RRVWSP, as dual intakes offer reliability and redundancy. Utilizing the McClusky Canal offers significant capital and operational cost savings. Pipeline segments A, E, F and H will be built in the future, when both intakes may be needed, as part of ENDAWS. Segments A and D are part of the State RRVWSP.



Phase	Project	Segments	Project Total (Miles)
1	State RRVWSP	D	93.2
	ENDAWS	G	31.7
2	State RRVWSP	A	23.0
	ENDAWS	F, H	15.3
	CNDWSP	E	6.0
		Total	169.2

Figure 3 -- Dual Intake Plan

FEDERAL MUNICIPAL, RURAL, AND INDUSTRIAL WATER SUPPLY PROGRAM APPLICATION FOR COST-SHARE

NORTH DAKOTA DEPARTMENT OF WATER RESOURCES

SFN 60796 (7/2021)

Submit application to Garrison Diversion Conservancy District and ND Department of Water Resources.

Project Sponsor: Garrison Diversion Conservancy District			Date: October 28, 2021
Contact Person Name: Merri Mooridian			Title: Administrative Officer
Address: PO Box 140	City: Carrington	State: ND	ZIP Code: 58421
Telephone Number: 701.652.3194	Email Address: merrim@gdcd.org		
Engineering Firm Name: Black & Veatch			
Project Engineer Name: Kip Kovar	Telephone Number: 701.652.3194		
Email Address: kipk@gdcd.org			
Project Name: Eastern North Dakota Alternate Water Supply (ENDAWS)			

Project Needs, Objectives, & Benefits

ENDAWS is a cost savings benefit for the RRVWSP by accessing water from the McClusky Canal. Utilizing ENDAWS will save $200M in capitol costs and $8M annually in drought operational costs. Accessing the McClusky Canal has been a long-term plan of the state and stakeholders. ENDAWS design will be pursued in conjunction with construction of the RRVWSP.

Area To Be Served

Multiple cities and rural water systems in central and eastern North Dakota.

Preliminary Engineering Report Included ☐ Yes ☒ No

Project Funding	SOURCE	FEASIBILITY STUDY	DESIGN	CONSTRUCTION	TOTAL
	Federal	$	$ 2,151,000.00	$	$ 2,151,000.00
	State	$	$	$	$ 20.20
	Local	$	$ 717,000.00	$	$ 717,000.00
	Other	$	$	$	$ 0.00
	TOTAL	$ 0.00	$ 2,868,000.00	$ 0.00	$ 2,868,000.00

Describe Efforts To Secure Other Funding For Project

Garrison Diversion is requesting $650,000 in federal MR&I funding to initiate 32 miles of pipeline design to 30% and initiate land acquisition efforts of ENDAWS. This equates to roughly $170 million in pipeline construction costs.

Water Rate Schedule		CURRENT	AFTER PROJECT	NOTE
	Base Rate	$	$	
	Cost Per 1,000 Gallons	$	$	
	Gallons In Base Rate			
	Cost For 5,000 Gallons	$	$	
	Service Connections			
	Population			

Feasibility Study	Start December 20, 2019	End October 26, 2020
Design	Start December 2021	End Dependent on Funding
Construction	Start Dependent on Funding	End Dependent on Funding

November 10, 2021

Garrison Diversion Unit
State Municipal, Rural, and Industrial Water Supply Program
Five Year Plan FY2022 - FY2026
Cooperative Agreement No. R17AC00049

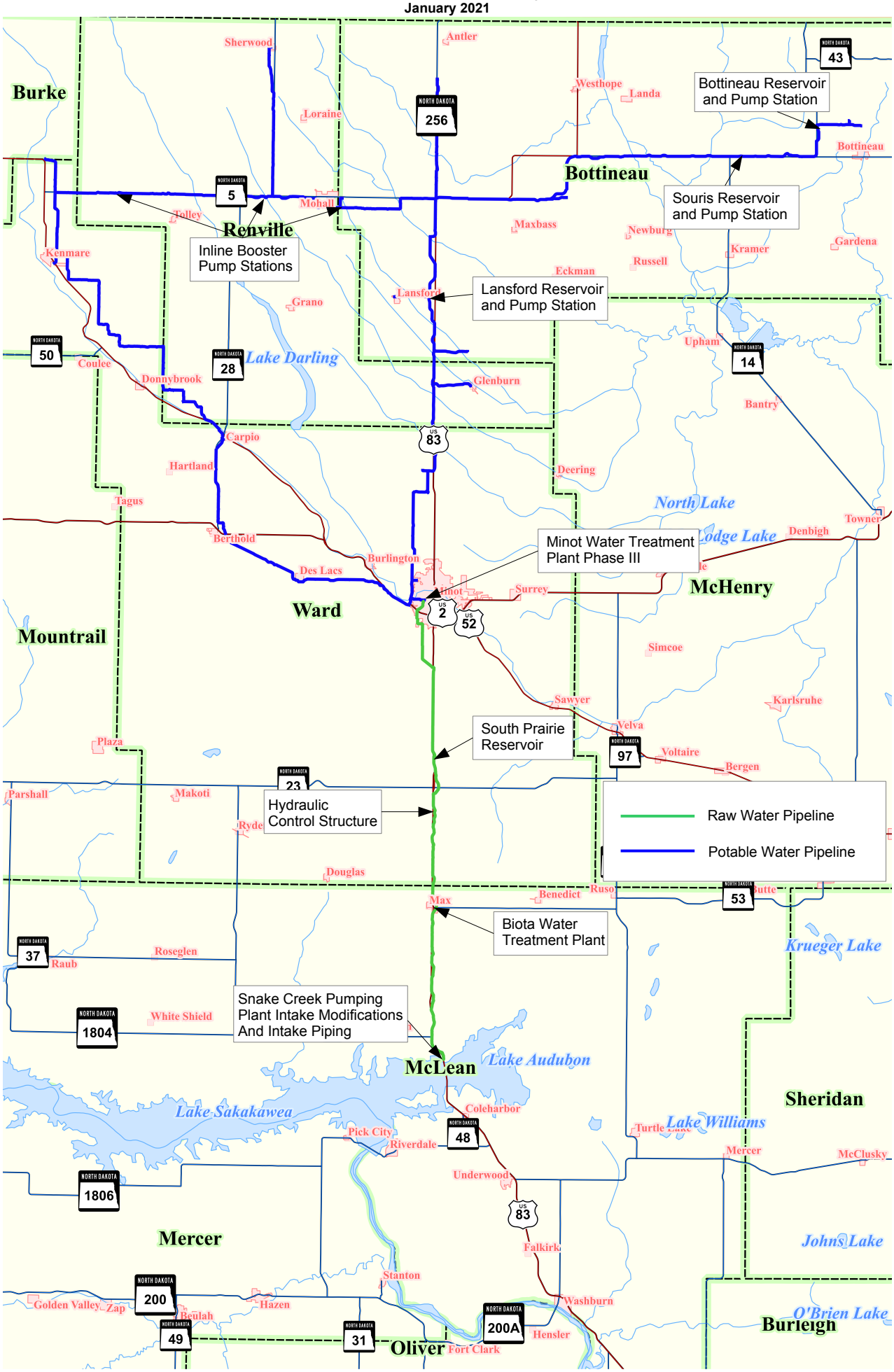
Project	Total Costs			FY 2022			FY 2023			FY 2024		
	Non Federal Share*	Federal Share	Project Total	Non Federal Share*	Federal Share	Project Total	Non Federal Share*	Federal Share	Project Total	Non Federal Share*	Federal Share	Project Total
NAWS Biota WTP and Pump Station Phase I Construction (7-2A/4-1A)	0	27,416,000	27,416,000	0	20,562,000	20,562,000	0	6,854,000	6,854,000	0	0	0
NAWS Minot WTP Phase III Construction (7-1C)	2,873,500	5,336,500	8,210,000	0	0	0	2,873,500	5,336,500	8,210,000	0	0	0
NAWS Bottineau/All Seasons Pumps and Storage Construction (5-4A)	2,905,350	5,395,650	8,301,000	0	0	0	2,905,350	5,395,650	8,301,000	0	0	0
NAWS Inline Booster Pump Stations Design (4-2D)	71,750	133,250	205,000	0	0	0	71,750	133,250	205,000	0	0	0
NAWS Inline Booster Pump Stations Construction (4-2D)	518,700	963,300	1,482,000	0	0	0	518,700	963,300	1,482,000	0	0	0
NAWS Biota WTP and Pump Station Phase II Design (7-2B/4-2B)	823,200	1,528,800	2,352,000	0	0	0	823,200	1,528,800	2,352,000	0	0	0
NAWS Biota WTP and Pump Station Phase II Construction (7-2B/4-2B)	5,487,000	20,344,000	25,831,000	0	0	0	0	0	0	0	19,373,250	19,373,250
NAWS Biota WTP and Pump Station Phase III Design (7-2C/4-1C)	2,046,000	0	2,046,000	0	0	0	0	0	0	0	0	0
NAWS Biota WTP and Pump Station Phase III Construction (7-2C/4-1C)	19,960,000	0	19,960,000	0	0	0	0	0	0	0	0	0
Eastern North Dakota Alternate Water Supply (ENDAWS)	0	0	0	0	0	0	0	0	0	0	0	0
Administration (BOR / GDCD / DWR)	117,091	3,536,645	3,653,736	22,500	680,000	702,500	22,950	693,090	716,040	23,409	706,952	730,361
Total	$34,802,591	$64,654,145	$99,456,736	$22,500	$21,242,000	$21,264,500	$7,215,450	$20,904,590	$28,120,040	$23,409	$20,080,202	$20,103,611

Project	FY 2025			FY 2026			
	Non Federal Share*	Federal Share	Project Total	Non Federal Share*	Federal Share	Project Total	Grant %
NAWS Biota WTP and Pump Station Phase I Construction (7-2A/4-1A)	0	0	0	0	0	0	100%
NAWS Minot WTP Phase III Construction (7-1C)	0	0	0	0	0	0	65%
NAWS Bottineau/All Seasons Pumps and Storage Construction (5-4A)	0	0	0	0	0	0	65%
NAWS Inline Booster Pump Stations Design (4-2D)	0	0	0	0	0	0	65%
NAWS Inline Booster Pump Stations Construction (4-2D)	0	0	0	0	0	0	65%
NAWS Biota WTP and Pump Station Phase II Design (7-2B/4-2B)	0	0	0	0	0	0	65%
NAWS Biota WTP and Pump Station Phase II Construction (7-2B/4-2B)	5,487,000	970,750	6,457,750	0	0	0	100%
NAWS Biota WTP and Pump Station Phase III Design (7-2C/4-1C)	2,046,000	0	2,046,000	0	0	0	100%
NAWS Biota WTP and Pump Station Phase III Construction (7-2C/4-1C)	19,960,000	0	19,960,000	0	0	0	100%
Eastern North Dakota Alternate Water Supply (ENDAWS)	0	0	0	0	0	0	75%
Administration (BOR / GDCD / DWR)	23,877	721,091	744,968	24,355	735,513	759,867	100/100/75%
Total	$27,516,877	$1,691,841	$29,208,718	$24,355	$735,513	$759,867	

	FY 2021		
	Non Federal Share*	Federal Share	Project Total
NAWS Biota WTP Phase I	$0	$20,400,000	$20,400,000
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
ENDAWS	216,700	650,000	866,700
Administration	22,500	680,000	702,500
	$239,200	$21,730,000	$21,969,200

***The non-federal share may be Department of Water Resources, City of Minot, Garrison Diversion Conservancy District or line of credit. Costs associated with Biota Water Treatment Plant are anticipated to be reimbursed by the federal government.**

Northwest Area Water Supply
January 2021



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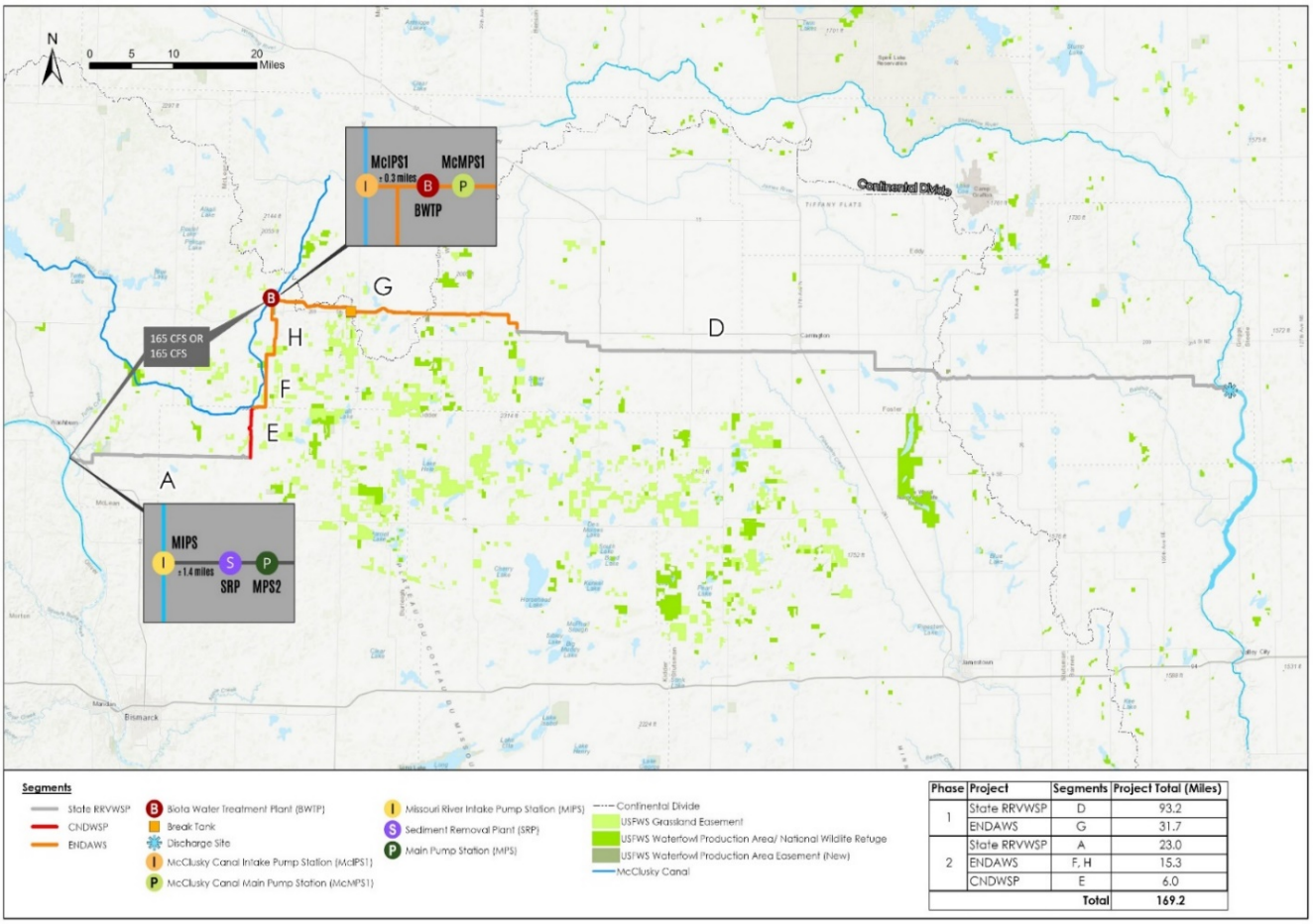

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Figure 3 -- Dual Intake Plan

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for the

NORTH DAKOTA DRINKING WATER STATE REVOLVING FUND

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prepared by the

DRINKING WATER STATE REVOLVING FUND PROGRAM

DIVISION OF MUNICIPAL FACILITIES

NORTH Dakota | Environmental Quality

Be Legendary.™

October 22, 2021

Table of Contents

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Appendices

Appendix A: Eligible and Ineligible Projects and Project-Related Costs Under the Drinking Water State Revolving Loan Fund (DWSRF) Program

Appendix B: Comprehensive Project Priority List and Fundable List for 2022

Appendix C: Priority Ranking System for Financial Assistance Through the Drinking Water State Revolving Loan Fund (DWSRF) Program

Appendix D: Non-Project Set-Aside and Loan Fee Activity

Appendix E: Amounts Available to Transfer Between State Revolving Fund Programs

Appendix F: Sources and Uses Table

Appendix G: Abbreviations

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Introduction

On August 6, 1996, President Clinton signed into law the Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). Section 1452 of the SDWA authorizes a Drinking Water State Revolving Loan Fund (DWSRF) Program. It further requires the U.S. Environmental Protection Agency (EPA) to enter into agreements with and make capitalization grants to eligible states to assist public water systems (PWSs) in financing the costs of infrastructure needed to achieve or maintain compliance with the SDWA and to protect public health.

North Dakota's legislature, under North Dakota Century Code (NDCC) section 61-28.1-11, established a drinking water revolving loan fund that would be administered by the North Dakota Department of Environmental Quality (NDDEQ). The powers and duties of the department include applying for grants from the EPA to be used for purposes authorized under SDWA, administering the fund, disbursing funds, establishing assistance priorities, and adopting rules necessary for the administration of the fund.

North Dakota's DWSRF federal allotments for fiscal years (FY) 1997 through 2021 totaled $237,879,100, and the anticipated 2022 allotment is $11,001,000. Allotted funds are provided by the EPA through capitalization grants and matched 20 percent by North Dakota.

DWSRF funds may be used for:

- Loans.
- Loan guarantees.
- A source of reserve and security for leveraged loans (the proceeds of which must be placed in the DWSRF).
- Buying or refinancing existing local debt obligations (publicly-owned systems only) where the initial debt was incurred and construction started after July 1, 1993.
- Earning interest prior to disbursement of assistance.

To the extent that there are enough eligible projects, at least 15 percent of the funds available for construction must be used annually to provide loan assistance to PWSs that serve fewer than 10,000 persons. Up to 30 percent of the funds available for construction may also be used to provide subsidized loans to disadvantaged communities. A portion of the DWSRF allotments may also be used for non-project set-aside activities such as:

- DWSRF Program administration (the maximum of the following: $400,000, 1/5

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percent of the current valuation of the fund, or 4 percent of all grant awards to the fund for the fiscal year).
- State program assistance (up to 10 percent).
- Small system technical assistance (up to 2 percent).
- Local assistance and state programs, including the delineation and assessment of source water protection areas (up to 10 percent for any one activity with a maximum of 15 percent for all activities combined).

PWSs eligible for DWSRF assistance include community water systems (both publicly- and privately-owned) and nonprofit noncommunity water systems. Federally-owned PWSs are not eligible to receive DWSRF assistance. Appendix A depicts the types of projects and project-related costs that are eligible and ineligible for DWSRF assistance.

Section 1452(b) of the SDWA requires each state to annually prepare an Intended Use Plan (IUP). The IUP must describe how the state intends to use the DWSRF funds to meet the objectives of the SDWA and further the goal of protecting public health. The IUP must be made available to the public for review and comment prior to submitting it to the EPA as part of the capitalization grant application. Specifically, the IUP must include a:

- Priority list of projects, including a description of the projects and the present size of the PWSs served.
- Description of the criteria and methods to be used for the distribution of funds.
- Description of the financial status of the DWSRF Program, including the use of set-asides along with funds reserved, and the amount of funds that will be used to assist disadvantaged communities.
- Description of the short- and long-term goals of the DWSRF Program, including how the capitalization grant funds will be used to ensure compliance and protect public health.

This document is intended to serve as the state of North Dakota's IUP for 2022 and will stay in effect until superseded by a subsequent IUP. In accordance with the authority granted to the NDDEQ under North Dakota Century Code (NDCC) Chapter 61-28.1, this document, based on comments received from the public, will be incorporated into a capitalization grant application and submitted to the EPA to further capitalize the state's DWSRF Program in the amount of $11,001,000. State match bonds were issued in 2018 to provide the 20 percent match for the capitalization grant**.** Bonds are anticipated to be issued in December 2021 or January 2022 to provide state match and potentially

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leverage the program. If state match bonds are not issued, up to $5 million could be transferred from the SRF state administrative account in FY2022 for state match funds.

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Priority List of Projects

States are required to develop and maintain a comprehensive priority list of eligible projects for funding and to identify projects that will receive funding in the first year after the capitalization grant award. In determining funding priority, states must ensure to the maximum extent practicable that priority for the use of funds be given to projects that: (1) address the most serious risks to human health; (2) are necessary to ensure compliance under the SDWA; and (3) assist systems most in need on a per household basis (i.e., affordability).

A DWSRF Program may provide assistance only for expenditures (excluding operation, maintenance, and monitoring) of a type or category which will facilitate compliance or otherwise significantly further health protection under the SDWA. Projects eligible for DWSRF financial assistance include investments to:

- Address present SDWA exceedances.
- Prevent future SDWA exceedances (of regulations presently in effect).
- Replace aging infrastructure.
- Restructure or consolidate water supplies.
- Buy or refinance existing debt obligations (publicly-owned systems only) where the initial debt was incurred and construction started after July 1, 1993.

Development Process

As part of the IUP development process, all potential DWSRF loan recipients were requested to notify the NDDEQ if they had a drinking water project not presently on the list and for which they were interested in pursuing DWSRF financial assistance. Systems with previously ranked and listed projects were requested to provide the NDDEQ with a written update for each project either not yet under construction or under construction using funds other than DWSRF funds. The updates were to include a detailed project description and cost estimate, the amount of DWSRF funds needed, and the anticipated construction start date. In lieu of this information, systems were asked to inform the NDDEQ if they no longer intended to complete a project or no longer intended to complete a project using DWSRF assistance. Systems requesting ranking of new projects were provided ranking questionnaires. Requests for project re-ranking or deletion were evaluated on a case-by-case basis, with ranking questionnaires provided as needed. Several projects were deleted due to completion (with or without DWSRF assistance) or the acquisition of other funding sources.

Finalized project priority lists may be amended to include new non-emergency projects. Amendments are subject to public review and comment and may require North Dakota

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State Water Commission approval. North Dakota plans to amend its 2022 IUP in June 2022. Projects added to the priority list during the mid-year amendment will not be eligible for loan forgiveness until the subsequent year.

Priority Ranking System

The priority ranking system was developed by the NDDEQ, the state agency with primary enforcement authority for the SDWA. The priority ranking system is designed to ensure that DWSRF funds are focused on solutions to address the most serious risks to human health, rectify SDWA compliance problems, and assist those systems most in need based on affordability considerations. The priority ranking system has received both EPA Region VIII and Headquarter concurrence. The priority ranking system will be amended as needed to reflect the changing nature of the SDWA and the DWSRF Program. Any significant amendments will be presented for public review and comment in an IUP.

Comprehensive Project Priority List and Fundable List

Appendix B contains the comprehensive project priority list. The fundable list represents those projects from the comprehensive project priority list anticipated to receive loan assistance this year. The list of projects is based on anticipated start dates, projected funding needs, and expected available loan funds (see Financial Status section of this document). The list will change if such information or assumptions vary, if higher ranked projects not on the list become ready to proceed, or if projects on the list are bypassed (see Criteria and Methods for the Distribution of Funds section of this document).

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Criteria and Methods for the Distribution of Funds

To the maximum extent possible, states are required to prioritize projects needed for SDWA compliance, projects that provide the greatest public health protection, and those projects that assist systems most in need based on affordability. The information below describes the process used by the NDDEQ to select projects for potential DWSRF assistance.

Ranking and Project Bypass Considerations

It is the intent of the NDDEQ that DWSRF funds are directed toward North Dakota's most pressing SDWA compliance problems and public health protection needs. To this end, the NDDEQ reserves the right to require the separation of project components into separate projects, if feasible and necessary, to focus on critical water supply problems. Project components which are separated will be ranked independently. Projects for existing PWSs, including refinancing projects, will be given preference over projects for the development of new water systems.

Under the SDWA, DWSRF funds may be used to buy or refinance existing local debt obligations (for publicly-owned systems only) where the initial debt was incurred and construction started after July 1, 1993. Cross-cutter requirements, including American Iron and Steel and Davis Bacon wage rate requirements, apply to these projects. American Iron and Steel requirements apply to projects with construction after December 16, 2014. Davis Bacon wage rate requirements apply to projects with construction after October 30, 2009. DWSRF assistance requests of this type, if eligible, will be ranked based on the original purpose and success of the constructed improvements. In the event of a tie in project rankings, new projects for existing systems will be given preference over refinancing projects.

The NDDEQ reserves the right to fund lower-ranked projects ahead of higher-ranked projects based on the considerations below. To the maximum extent possible, the NDDEQ will work with bypassed projects to ensure that they will be eligible for funding in the following fiscal year. Criteria reviewed in bypassing a project include:

- Readiness to proceed (i.e., applicant is prepared to begin construction and is immediately ready or poised to be ready to enter into assistance agreements).
- Willingness to proceed (e.g., applicant withdraws project from consideration, obtains other funding sources, or is nonresponsive).
- Emergency conditions (i.e., an unanticipated failure occurs requiring immediate attention to protect public health).
- Financial (includes inability to pay and loan repayment issues), technical, or

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managerial capability.

- Meets the 15 percent requirement (i.e., funding lower-ranked project would satisfy the requirement that at least 15 percent of the funds available for construction be used annually to provide loan assistance to PWSs that serve populations of fewer than 10,000 persons).
- Inability to verify initial ranking score.

The NDDEQ reserves the right to fund unanticipated, non-ranked emergency projects requiring immediate attention to protect public health without going through a public review process. Such assistance will be limited to (1) eligible PWS types and project features and (2) situations involving acute contaminants, loss or potential loss of a water supply in the near future, or that otherwise represent an unreasonable risk to health.

Capacity

Section 1452 of the 1996 SDWA Amendments precludes states from providing DWSRF assistance to any eligible PWS that lacks the capacity to maintain SDWA compliance, unless the PWS owner or operator agrees to undertake feasible and appropriate changes to ensure compliance over the long term. States are also precluded from providing DWSRF assistance to any eligible PWS that is in significant noncompliance with any requirement of a National Primary Drinking Water Regulation (NPDWR) or variance, unless such assistance will ensure compliance. In the context of the SDWA, PWS capacity refers to the overall technical, managerial, and financial capability of a PWS to consistently produce and deliver drinking water meeting all NPDWRs. The NDDEQ has the legal authority and responsibility under NDCC Chapter 61-28.1 to ensure PWS capacity.

The NDDEQ will use the DWSRF loan application as the principal control point for capacity assessment. Information from the loan application and other available and relevant information (such as SDWA compliance data, sanitary survey reports, and operator certification status) will be evaluated to assess capacity at present and for the foreseeable future. The North Dakota Public Finance Authority (PFA), as financial agent for the DWSRF Program through formal agreement, will evaluate the financial information provided in the loan application. Based upon input provided by the NDDEQ regarding technical and managerial capability, the PFA will make recommendations to the NDDEQ concerning financial capability. The final decision regarding overall capacity will be made by the NDDEQ.

As required by the SDWA, DWSRF assistance will be denied to applicants considered priority systems because they score 11 or higher in the Enforcement Tracking Tool if it is

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determined that the project will not ensure compliance. Likewise, DWSRF assistance will be denied to applicants that lack capacity if they are unwilling or unable to undertake feasible and appropriate changes to ensure capacity over the long term. The lack of capacity at the time of loan application will not preclude DWSRF assistance if the project will ensure compliance, or the applicant agrees to implement changes that will rectify capacity problems. On a case-by-case basis, special conditions may be included in loan agreements to rectify compliance and/or capacity problems. As needed and appropriate, the NDDEQ will utilize other specific legal authorities as control points to ensure capacity. This includes the review and approval of plans and specifications. Under NDCC Chapter 61-28.1 and North Dakota Administrative Code (NDAC) Chapters 33.1-03-08 and 33.1-18-01, the NDDEQ is both empowered and required to review and approve plans and specifications for all new or modified drinking water facilities prior to construction.

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Set-Aside and Fee Activities

Under the SDWA, states are required to set aside a percentage of their available DWSRF loan funds to provide financial assistance to small systems. States, at their option, may also set aside a portion of their federal DWSRF allotment for other project and non-project activities and assess fees on loans to assist with administration costs. A description of the different set-asides and past/proposed activities related to set-asides and fees follows.

Mandatory Small System Project Set-Aside

To the extent that there are enough eligible projects to fund, states must annually use at least 15 percent of all funds credited to the DWSRF loan fund to provide loan assistance to PWSs that serve fewer than 10,000 people. States that exceed the 15 percent requirement in any one year are permitted to reserve the excess for future years.

A total of 296 loans totaling $709,493,552 have been approved as of June 30, 2021. Of these, 243 loans (totaling $302,798,203 or 42.8 percent of loan total) represent PWSs that serve fewer than 10,000 people. The NDDEQ envisions that additional loans will be made to small PWSs based on the comprehensive project list and fundable list (See Appendix B).

Mandatory Additional Subsidization Set-Aside

Congress has mandated in previous appropriations bills that 14 to 30 percent of assistance provided from DWSRF capitalization grants be in the form of additional subsidies. The DWSRF program provides these additional subsidies as loan forgiveness. The NDDEQ has the authority under state law (NDCC Chapter 61-28.1) to provide financial assistance through the DWSRF as authorized by federal law and EPA.

It is unknown at this time if mandatory additional subsidization will apply to the FY 2022 DWSRF allotment. To address this potential requirement, 14 percent (the minimum required) plus $100,000 additional subsidization will be made available as loan forgiveness.

For 2022, projects that contain lead service line replacement activities will qualify for up to 90 percent loan forgiveness for the lead service line replacement portions of the project. Loan forgiveness will be allocated based on position on the project priority list for loan applications submitted until April 1, 2022 and then will be allocated on a first-come first-serve basis of loan application submittal, thereafter. DWSRF loan and loan forgiveness can be bundled together with funding from other sources to form funding

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packages for projects. The combined loan forgiveness and grant in a bundled funding package must be less than or equal to 90 percent of all project costs.

The 2021 capitalization grant allowed states to use additional subsidization for debt incurred prior to December 27, 2020 if the state, with concurrence from the EPA Region, determines that such funds could be used to help address a threat to public health from heightened exposure to lead in drinking water. Priority will be given to financing new construction, then if allowed by the 2022 capitalization grant, the remaining funds will be used to finance prior construction.

Timely progression of additional subsidization projects is required. To ensure this, there will be a first loan draw deadline, a construction contract notice of award deadline, and a loan forgiveness disbursement deadline. If projects identified as receiving additional subsidization do not meet these deadlines, the additional subsidization set-aside will be used to fund lower-ranked projects on the project priority list.

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Disadvantaged Community Set-Aside

States shall provide additional loan subsidies (i.e., reduced interest or negative interest rate loans, principal forgiveness) to benefit communities meeting the definition of disadvantaged or which the state expects to become disadvantaged as the result of the project. A disadvantaged community is one in which the entire service area of a PWS meets affordability criteria established by the state following public review and comment. The value of the subsidies may not be less than 6 percent or more than 35 percent of the amount of the federal capitalization grant for any fiscal year. For 2022, the DWSRF will distribute at least 20 percent but not more than 21 percent of the amount of the capitalization grant.

Criteria for determining the amount of loan forgiveness is on a project-specific basis. Loan forgiveness will be based on the relative future water cost index (RFWCI). The RFWCI is defined as the ratio of the expected average annual residential water user charge resulting from the project, including costs recovered through special assessments, to the local median household income (based on the most-recent American Communities Survey 5-Year Estimate).

For 2022, projects with a RFWCI of 2.0 percent or greater will qualify for 75 percent loan forgiveness. Projects with a RFWCI of 1.5 percent to 1.9 percent will qualify for 40 percent loan forgiveness. Projects with a RFWCI of less than 1.5 percent will not qualify for any loan forgiveness. Projects that do not qualify for loan forgiveness still qualify for a traditional DWSRF loan.

Loan forgiveness will only be used to finance new construction. DWSRF loan and loan forgiveness can be bundled together with funding from other sources to form funding packages for projects. The combined loan forgiveness and grant in a bundled funding package must be less than or equal to 90 percent of project costs.

Timely progression of additional subsidization projects is required. To ensure this, there will be a first loan draw deadline, a construction contract notice of award deadline, and a loan forgiveness disbursement deadline. If projects identified as receiving additional subsidization do not meet these deadlines, the additional subsidization set-aside will be used to fund lower-ranked projects on the project priority list.

The fundable portion of the comprehensive project priority list depicts 20 percent plus $100,000 additional subsidization through loan forgiveness.

Optional Non-Project Set-Asides

States may use a portion of their federal DWSRF allotment (up to specified ceilings) for the following non-project set-aside activities:

- DWSRF Program administration - the maximum of $400,000, 1/5 percent of the current valuation of the fund, or 4 percent of all grant awards to the fund for the fiscal year.
- State program administration - up to 10 percent.
    - Public Water Supply Supervision (PWSS) Program
    - Source water protection program(s)
    - Capacity development program
    - Operator certification program
- Small system technical assistance (serving 10,000 or fewer people) - up to 2 percent.
- Local assistance and other state programs - up to 10 percent for any one activity with a maximum of 15 percent for all activities combined.
    - Loans to PWSs to acquire land or conservation easements for source water protection programs.
    - Loans to community water systems to implement source water protection measures or to implement recommendations in source water petitions.
    - Assist PWSs in capacity development.
    - Assist states in developing/implementing EPA-approved wellhead protection programs.

States may transfer funds among the non-project set-aside categories or between the loan fund and such set-aside categories, provided that the statutory set-aside ceilings

DRAFT

are not exceeded. Non-project set-aside funds may be transferred at any time to the loan fund. However, loan commitments must be made for the transferred funds within one year of the transfer of payments that have already been taken for the set-aside funds. Monies intended for the loan fund may be transferred to non-project set-asides only if no payments have yet been taken for the monies to be transferred. Otherwise, funds in or transferred to the loan fund must remain in the loan fund. Transfers may be done only if described in an IUP and approved by the EPA as part of a capitalization grant agreement or amendment.

Non-Project Set-Aside and Fee Activity

Appendix D depicts non-project set-aside and fee activity. The FY2022 federal DWSRF allotment for North Dakota is anticipated to be $11,001,000. The NDDEQ does not intend to set aside any of the allotment for non-project activities and will instead utilize existing open capitalization grants and/or its 0.5 percent administration fee for funding these activities. The NDDEQ will reserve $1,100,100 of PWSS Program set-aside funds from the FY2022 capitalization grant for use in future years, in addition to funds held in reserve from previous years. The NDDEQ will reserve its 2 percent set-aside for small system technical assistance ($220,020) for use in future years. The DWSRF administration set-aside method used is the 1/5 percent of the current valuation of the fund option. The current valuation of the fund as of December 31, 2020 was $269,837,000 according to audited financial statements, which results in an administration set-aside of $539,674. All of this amount will be held in reserve for future years as the DWSRF Program will use the SRF administrative set-aside to fund DWSRF administrative activities.

Under the SDWA, states are permitted to assess fees on loans to support DWSRF administration costs. North Dakota DWSRF loan recipients are required to pay an annual loan administration fee presently set at 0.5 percent of the outstanding loan principal balance. This loan administration fee is payable semiannually on each loan payment date. The fees are held under the master trust indenture and are available to pay DWSRF administration costs allowable under the SDWA. Fees will also be used to fund Planning Assistance Reimbursement Grants as described below or for any of the purposes allowed in 40 CFR 35.3530(b)(2). To enable continued management of the DWSRF once the DWSRF is no longer annually capitalized through federal grants, loan administration fees will be held and used for loan-bond servicing and DWSRF administration as allowed under the SDWA. The loan administration fees were also used from 2008 to 2016 as a source of 1:1 match that is required when using the state program administration set-aside to administer the PWSS Program.

DRAFT

To meet congressional and EPA capitalization grant spend-down intent for the DWSRF Program, funds from any of the set-asides may be moved to the construction loan fund during 2021. This amount will also be held in reserve for use from future capitalization grants.

Planning Assistance Reimbursement (PAR) Grants

The DWSRF Program plans to offer grants to assist communities in developing shovel-ready projects. For 2022, grants will be awarded to communities with populations of less than 2,500 people on a first-come first-served basis. Applications will be sent to systems with projects that have been identified by the Intended Use Plan as potential loan forgiveness recipients in future years. Also, applications will be distributed to potential projects that plan to be included on future IUPs. Planning grants will be awarded to systems that intend to follow through with the study's recommendations and anticipate seeking a DWSRF loan to do so. The grant may cover up to 80% of the costs (for a maximum of $15,000) for completion of a project-specific engineering report. Grants will be funded from the SRF administrative account.

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Financial Status

The information presented below describes the financial structure of the North Dakota DWSRF, the method used to generate the required state match, transfers between state revolving loan funds (SRFs), the basis for approving loans, loan assistance terms (including a discussion concerning market interest rates in North Dakota), sources and intended use of funds, and special considerations for State and Tribal Assistance Grants (STAG) grants.

Financial Structure

Bonds for the 20 percent state match are issued by the PFA under a master trust indenture adopted by the Industrial Commission of North Dakota. The PFA may also issue leveraged bonds under the master trust indenture, the proceeds of which can be used to fund loans.

The current demand for DWSRF loan assistance in North Dakota exceeds authorized federal DWSRF allotments and the required state match for those allotments. Under the financial structure initially established for the DWSRF, excess leveraging and higher loan interest rates would be needed to satisfy this excess demand.

A modified financial structure within the existing master trust indenture has been implemented to better satisfy the continuing high demand for DWSRF financial assistance, yet avert excessive leveraging and higher loan interest rates. Under the modified structure, DWSRF allotments and state match bond proceeds will be used first to fund loans. Leveraged bonds will be issued only if (1) loan demand exceeds the amount of DWSRF allotments and state match available for loans or (2) deemed in the best interest of the program. If leveraged bonds are issued, they will be sized together with DWSRF allotments and state match to satisfy current cash flow needs as represented by the projected annual construction costs of eligible projects. This funding approach will expedite loan assistance to more projects that are ready to proceed to construction, avert premature or unnecessary bond issuances, and ensure a more reliable loan repayment stream to satisfy both bond debt service requirements and future loan demand.

In the event there are insufficient amounts available to make scheduled principal and interest payments on outstanding DWSRF bonds when payments are due, the master trust indenture for the DWSRF provides the trustee may transfer available excess revenues from the Clean Water State Revolving Fund (CWSRF) to the DWSRF bond fund to meet the deficiency. Following such a transfer, the DWSRF has an obligation to reimburse the CWSRF with future available DWSRF excess revenues.

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State 20 Percent Match Requirement

Under the SDWA, states are required to match their DWSRF allotment at an amount at least equal to 20 percent. North Dakota has issued state match bonds to satisfy match requirements through FY2025. It is anticipated that additional State Match bonds will be issued in 2021 or 2022.

Anticipated Proportionality Ratio

Leveraged and state match bonds were sold in 2018. The required 20 percent state match has been provided through approximately FY2025. Payments were made using 100 percent state match funds until all of the match funds were disbursed. The program is in an over-matched condition at this time.

Disbursement of Funds

Funds will be disbursed in the following order: federal capitalization grants, state match bond proceeds, leveraged bond proceeds, and FCLA. All state match funds have been disbursed and the DWSRF is currently over-matched. Set-asides are closely monitored and disbursed quickly when requests are made to ensure timely expenditure and avoid over-accumulation. All federal funds are disbursed in a first-in, first-out manner.

Transfer of Funds Between DWSRF and CWSRF

At the governor's discretion, a state may transfer up to 33 percent of its DWSRF capitalization grant to the CWSRF or an equal amount from the CWSRF to the DWSRF. In addition to transferring grant funds, states can transfer state match, investment earnings, principal and interest repayments, unrestricted cumulative excess, restricted cumulative excess, or FCLA funds between SRF programs.

Transfers were authorized by the governor in 2002, 2004, 2007, 2009, and 2015. These funds are transferred between the programs on an as-needed basis. The governor's authorizations are as follows:

- 2002 - $10 million from CWSRF to DWSRF
- 2004 - $4 million from CWSRF to DWSRF
- 2007 - $20 million from CWSRF to DWSRF (with provision to return funds to CWSRF as needed)
- 2009 - $2.6 million of American Recovery and Reinvestment Act of 2009 funds from CWSRF to DWSRF
- 2015 - $60 million from DWSRF to CWSRF (with provision to return funds to DWSRF as needed)

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The NDDEQ is anticipating the transfer of funds from the CWSRF in 2022, as authorized in 2015. Approximately $10 million of non-federal funds will be transferred.

The NDDEQ transfers funds on a net basis, since prior transfers have occurred between the two SRFs. The current net transfer between programs is $25,529,972 from the CWSRF to the DWSRF. The $10 million transfer from the CWSRF in 2022 will change the net transfers between programs to $35,529,972. With this transfer, the DWSRF will be able to fund additional water projects during 2022. Transferring funds will not impact DWSRF set-aside funding. Appendix E itemizes the amount of funds transferred to and from the DWSRF Program.

Funding Process

Projects may be submitted to the NDDEQ each year for consideration and inclusion into an IUP. A new IUP is developed for public review and comment in the fall of each year. New and eligible projects for which ranking questionnaires are submitted are evaluated, ranked (if possible), and included on the comprehensive project priority list. Requests for re-ranking of previously listed and ranked projects are evaluated on a case-by-case basis and may require the completion of an updated ranking questionnaire.

Loan approvals are based on project ranking, readiness to proceed, and availability of funds based on cash flow considerations, including projected disbursements under already approved and potential new loans. The NDDEQ is prepared to issue leveraged bonds if the loan demand exceeds the amount of available DWSRF allotments and state match or if it is in the best interest of the program.

Loan Assistance Terms

The base repayment period for DWSRF loans under the SDWA is 30 years following project completion. The NDDEQ may utilize shorter repayment periods on a project-by-project basis depending on its useful life or the preference of the borrower. Candidate projects include low-cost projects for which minimal water rate increases will be required to retire the loan debt. A 30-year repayment period will be granted if it is determined that the principal portion of the loan for project components that have a useful life of 20 years or less will be paid off within 20 years. Project components considered having a 20-year or less useful life are process equipment, pumps, electrical equipment, controls, and auxiliary equipment. Project components considered to have a 30-year or more useful life are buildings, concrete, other structures, conveyance structures (piping), and earthen structures. The America's Water Infrastructure Act of 2018 authorizes loan terms of 40 years or the useful life of the project for disadvantaged communities and under certain circumstances when purchasing or refinancing debt

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obligations for non-disadvantaged communities. The North Dakota DWSRF Program reserves the right to approve loan terms of up to 40 years or the useful life of the project.

The loan interest rate will be 1.5 percent for PWSs and may be adjusted, if necessary. Leveraged bonds will be discussed later in this section. As discussed under Set-Aside and Fee Activities, an annual loan fee of 0.5 percent is assessed on all loans to support DWSRF administration.

The SDWA requires that the interest rate for a loan be less than or equal to the market interest rate and will adjust as necessary. The NDDEQ will establish as the market interest rate the average interest rate received by North Dakota political subdivisions on bond issues with a 20-year maturity and sold on a competitive or negotiated basis during the prior quarter. This rate will be calculated and updated quarterly based upon the prior quarter bond sales. If there are no qualified bond sales, the market rate for that quarter will be calculated using comparable regional bond issues. Based upon second quarter 2021 North Dakota 20-year competitive bond sales, the current market interest rate is 2.3 percent.

Leveraging the fund is appropriate where financing needs significantly exceed available funds; however, it impacts the DWSRF by reducing the interest rate subsidy provided or reducing future loan capacity. By continuing to leverage, the program will be able to assist more communities currently on the priority list and help those communities achieve or remain in compliance with the SDWA. Loans necessitating leveraging will be subject to a loan interest rate (including the 0.5 percent administration fee) of 75 percent of the current market interest rate, if needed, to maintain program viability. The interest rate on these loans will be more than the regular DWSRF interest rate which currently is 2.0 percent (including the 0.5 percent administration fee). The DWSRF Program anticipates issuing bonds to leverage the program in 2021 or 2022.

The NDDEQ and the PFA strive to ensure continued long-term viability of the program to provide loans for eligible drinking water projects. To achieve this goal, the refinancing of completed DWSRF projects will not be allowed using the extended-term financing option or the latest interest rate.

Sources and Uses of Funds

Appendix F depicts a detailed breakdown of sources and uses of funds from FY1997 through FY2021. An additional $69,001,000 of new funds is anticipated to become available in 2022, making $10,982,669 available for projects. All the funds are allocated

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to projects as shown in the Comprehensive Project Priority List and Fundable List (Appendix B).

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Short- and Long-Term Goals

The 1996 SDWA Amendments authorize a DWSRF Program to assist PWSs in financing the costs of infrastructure needed to achieve or maintain compliance with SDWA requirements and to protect public health. The objectives of the NDDEQ's DWSRF Program include addressing public problems and priorities, ensuring compliance with the SDWA, assisting systems to ensure affordable drinking water, and maintaining the long-term viability of the fund. To address these objectives, the DWSRF Program will help ensure that North Dakota's public water supplies remain safe and affordable through prioritized financial assistance, enhanced source water protection activities, and increased technical assistance to small systems. The short and long-term goals set forth below are established to accomplish these objectives.

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Short-Term Goals

1. On December 10, 2021, obtain North Dakota Department of Water Resources approval of this IUP.
2. Continue to implement the DWSRF Program for the state of North Dakota by funding projects for systems that are having problems maintaining compliance with the lead and copper rule, revised total coliform rule, ground water rule, the arsenic rule, the disinfection byproduct rule series, and the surface water treatment rule series.

Long-Term Goals

1. Help North Dakota PWSs achieve and maintain compliance with the SDWA. This is accomplished by coordinating with the PWSS Program and targeting those rules with which systems in the state are having problems maintaining compliance. These include the lead and copper rule, revised total coliform rule, ground water rule, the arsenic rule, the disinfection byproduct rule series, and the surface water treatment rule series.
2. Assist the PWSS Program in meeting goals. The DWSRF Program assistance includes providing technical support on infrastructure issues, capacity reviews, and small system technical assistance. Through the small system technical assistance set-aside, the DWSRF Program helps operators become certified and systems return to compliance and maintain capacity.
3. Administer the DWSRF Program in a manner that will maximize the long-term availability of funds for eligible and needed drinking water infrastructure improvements.
4. Assist North Dakota PWSs in improving drinking water quality, quantity, and dependability by providing reduced interest rate and long-term financial

assistance for eligible and needed drinking water infrastructure improvements. This infrastructure assistance helps with compliance of drinking water rules, regionalization/consolidation, and replacement of aging infrastructure.

5. To the greatest extent possible, continue to integrate DWSRF funding with other available funding to maximize the benefits to public water systems and needed drinking water projects statewide. The cooperating agencies include the U. S. Department of Agriculture, Community Development Block Grant Program, North Dakota Department of Land Trusts, the Bank of North Dakota, and the North Dakota State Water Commission.

Environmental Results

1. Loan Fund
    a. Through December 31, 2020, the fund utilization rate (as measured by the ratio of executed loans to funds available for projects) was 103 percent which is above the June 30, 2020 national average of 96 percent. The 2022 goal is to maintain the fund utilization rate at 90 percent or above.
    b. Through December 31, 2020, the rate at which projects progressed (as measured by disbursements as a percentage of assistance provided) was 91 percent. This is above the June 30, 2020 national average of 87 percent. The 2022 goal is to maintain the construction pace above 80 percent.
    c. The DWSRF Program funded six projects in the first six months of 2021 totaling $7,215,500 and serving a population of 48,143. The 2022 goal is to fund 12 loans totaling $15 million and serving a population of 20,000.
2. Set-Asides, Small System Technical Assistance
    a. The goal for the number of systems receiving training is 120.
    b. The goal for the number of systems receiving on-site technical assistance is 50.

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Public Participation

A state is required to make its annual IUP available to the public for review and comment prior to submitting it to the EPA as part of its capitalization grant application. States are also required to describe the public review process used and how major comments and concerns received were addressed.

Process

The public will be invited to comment on the draft 2022 IUP at a public hearing held on Microsoft Teams on November 4, 2021. Written comments will be accepted until November 18, 2021

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Appendix A

Eligible and Ineligible Projects and Project-Related Costs Under the Drinking Water State Revolving Loan Fund (DWSRF) Program

Examples of Eligible Projects and Project-Related Costs

- Projects that address present Safe Drinking Water Act (SDWA) exceedances.
- Projects that prevent future SDWA exceedances (applies only to regulations in effect).
- Projects to replace aging infrastructure.
- Rehabilitate or develop drinking water sources (excluding reservoirs, dams, dam rehabilitation, and water rights) to replace contaminated sources.
- Install or upgrade drinking water treatment facilities if the project would improve the quality of drinking water to comply with primary or secondary SDWA standards.
- Install or upgrade storage facilities, including finished water reservoirs, to prevent microbiological contaminants from entering the water system.
- Install or replace transmission and distribution piping to prevent contamination caused by leaks or breaks, or to improve water pressure to safe levels.
- Projects to restructure and consolidate water supplies to rectify a contamination problem, or to assist systems unable to maintain SDWA compliance for financial or managerial reasons (assistance must ensure compliance).
- Projects that purchase a portion of another system's capacity if such purchase will cost-effectively rectify an SDWA compliance problem.
- Land acquisition.
    - Land must be integral to the project (i.e., needed to meet or maintain compliance and further public health protection, such as land needed to locate eligible treatment or distribution facilities).
    - Acquisition must be from a willing seller.
- Planning (including required environmental assessment reports), design, and construction inspection costs associated with eligible projects.
- Service lines from the main to the house, including lead service lines.

Examples of Ineligible Projects and Project-Related Costs

- Dams or rehabilitation of dams.
- Water rights, except if the water rights are owned by a system that is being purchased through consolidation as part of a capacity development strategy.

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- Reservoirs, except for finished water reservoirs and those reservoirs that are part of the treatment process and are located on the property where the treatment facility is located.
- Drinking water monitoring costs.
- Operation and maintenance costs.
- Projects needed mainly for fire protection.
- Projects for systems that lack adequate technical, managerial, and financial capability, unless assistance will ensure compliance.
- Projects for priority systems in the Enforcement Tracking Tool, unless funding will ensure compliance.
- Projects primarily intended to serve future growth.

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Appendix B

Comprehensive Project Priority List and Fundable List for 2022

Shaded projects are on the fundable list

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
174	1801056-21-01	Agassiz WUD	4,104	User and transmission expansion - Phase II	1,500	2022		AE2S
59	4001153-14-01	All Seasons WUD	754	Parallel & looped pipelines to increase flow in low pressure areas	796	2022		Bartlett & West
135	4001153-14-02	All Seasons WUD	754	Service to Turtle Mountains/Lake Metigoshe area	27,920	2022		Bartlett & West
136	4001153-15-01	All Seasons WUD	754	System 4 to system 1 interconnection	6,638	2022		Bartlett & West
3	4001153-21-01	All Seasons WUD	4,200	Refinance of projects for well, reservoir, SCADA, & pipeline improvements	3,929	-	20+	Bartlett & West
60	4001153-21-02	All Seasons WUD	4,200	Increased supply to area around and north of Rolla	371	2022		Bartlett & West
78	3000012-22-01	Almont	115	Water main & service line replacement	1,000	2022		Moore
5	0900017-22-01	Amenia[4]	94	Water main replacement & looping, water meter replacement, & storage improvements	500	2023		Moore
23	3200023-21-01	Aneta	222	Water main replacement	3,000	2023		Moore
67	2600038-21-01	Ashley	700	Water tower replacement	2,000	2022		Moore
62	2600038-21-02	Ashley	700	Water main replacement & looping	1,000	2022		Moore
7	2600038-21-03	Ashley	700	WTP upgrade	2,500	2022		Moore
185	0201058-20-01	Barnes RWD	5,037	Additional storage at four booster stations	3,181	2022		Interstate
134	1700059-20-01	Beach	981	Water tower rehab	398	2022		AE2S
20	1700059-22-01	Beach[4]	981	Water main & lead service line replacement, transmission main for looping	1,900	2022		AE2S
181	4500065-15-01	Belfield	1,013	Transmission line & pressure reducing valves	1,615	2023		Brosz
156	4500065-18-01	Belfield	1,000	Water main replacement	2,606	2022		AE2S
226	4500065-18-02	Belfield	1,000	Water storage rehab or replacement	3,193	2022		AE2S
276	5100072-18-02	Berthold	454	Water tower rehab	300	2022		Moore
111	5100072-21-01	Berthold	454	Water main, hydrant, gate valve, & service line replacement	5,000	2023		Moore
51	2900074-20-01	Beulah	3,328	Water main, hydrant, gate valve, & service line replacement	37,315	2022		Intestate
9	4800078-22-01	Bisbee[4]	125	Water main, service line, gate valve, & hydrant replacement	3,600	2022		Apex
248	0800080-22-02	Bismarck	85,400	WTP expansion	60,000	2023		-
175	0800080-22-01	Bismarck[4]	85,400	Water main & lead service line replacement	3,520	2022		-
258	0700114-20-01	Bowbells	301	Water tower site piping upgrades	100	2022		AE2S
266	0700114-20-02	Bowbells	301	Transmission line improvements	236	2022		AE2S
208	0700114-21-01	Bowbells	301	Water tower replacement	1,854	2022		AE2S
269	0700114-21-02	Bowbells	301	Water main looping (Railway St SE)	175	2022		AE2S
249	0600119-14-01	Bowman	1,620	Water main replacement (4th Ave W)	1,210	2022		Brosz
263	0600119-19-01	Bowman	1,620	Storage tank improvements	1,015	2022		Brosz
97	0900134-11-01	Buffalo	225	Water main, service line, gate valve, & hydrant replacement	1,900	2023		Moore
270	5100138-12-01	Burlington	1,310	Water storage tank	1,650	2023		Ackerman-Estvold
202	5100138-22-01	Burlington[4]	1,310	Water main replacement	435	2022		Ackerman-Estvold

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Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
79	4800152-13-02	Cando[4]	1,115	Water main, service line, gate valve, & hydrant replacement	2,000	2022		Moore
169	1600159-20-01	Carrington	2,220	Water main replacement & rehab	1,000	2022		Interstate
244	1600159-22-01	Carrington	2,220	Water main to Dakota Growers Pasta Co.	500	2022		Interstate
32	1900162-22-01	Carson	238	Water main replacement (Railroad Ave, 1st Ave, & 2nd Ave)	4,700	2023		Moore
50	1900162-22-02	Carson	238	Water tank replacement	2,250	2023		Moore
109	0901060-16-01	Cass RWD	17,500	Transmission lines for correction of water quantity & pressure issues	7,500	2022		AE2S
157	0900166-20-01	Casselton	2,513	Water main, gate valve, & hydrant replacement	4,500	2024		Moore
151	0900166-22-01	Casselton	2,513	Water main, service line, gate valve, & hydrant replacement (2nd St N) & water main looping	1,350	2023		Moore
256	0900166-19-01	Casselton[4]	2,513	Lead service line replacement	910	2022		Moore
81	3400170-22-01	Cavalier	1,302	Water main replacement (W 2nd Ave, Madison St, & River St)	1,316	2022		AE2S
1	3300174-22-01	Center	600	Reservoir improvements & water main replacement	3,100	2023		Moore
103	3900183-09-01	Christine	150	Water main, gate valve, & hydrant replacement	700	2022		Moore
36	2800194-20-02	Coleharbor	82	Water main & service line replacement	1,500	2022		Moore
273	3900196-06-01	Colfax	175	Water main for redundancy	656	2022		Interstate
94	3900196-22-01	Colfax	175	Reservoir improvements	800	2023		Interstate
178	0700198-16-01	Columbus	133	Water main replacement	1,700	2022		Ackerman-Estvold
25	1200211-22-01	Crosby[4]	1,065	Water main replacement	3,115	2024		Interstate
219	2001061-21-01	Dakota RWD	3,869	Service to users on private wells	750	2022		AE2S
71	2001061-21-02	Dakota RWD	3,869	Well & WTP expansion for service to Hannaford	750	2023		AE2S
158	0900217-11-01	Davenport	293	Pump station & water storage replacement, distribution system redundancy	1,035	2022		Interstate
18	0200226-22-01	Dazey	104	Electrical upgrades, generator installation, pump repair	120	2022		Interstate
200	4500242-21-01	Dickinson[4]	22,000	Water main, lead service line, & hydrant replacement (Sims St)	2,500	2022		Apex
201	4500242-22-01	Dickinson[4]	22,000	Water main, lead service line, & hydrant replacement (4th Ave W & 5th Ave W)	1,500	2022		Apex
47	1300259-22-01	Dodge	101	Water distribution system improvements (Phase 2)	7,000	2022		KLJ
98	3400269-21-01	Drayton	751	Water main & hydrant replacement	5,000	2022		Moore
186	1801062-15-01	East Central RWD	21,098	Transmission lines	1,372	2022		AE2S
115	1801062-21-01	East Central RWD	21,098	Transmission line & WTP improvements	2,250	2023		AE2S
37	1900303-21-01	Elgin	642	Water main replacement	2,300	2022		Moore
89	3700314-02-01	Enderlin	890	Well field & transmission line	1,700	2024		Moore
127	3700314-02-03	Enderlin	890	WTP improvements	4,700	2025		Moore
128	3700314-08-01	Enderlin	890	Water tower replacement	2,000	2024		Moore
126	3700314-02-02	Enderlin[4]	890	Water main replacement	900	2024		Moore

DRAFT

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
124	3900333-06-01	Fairmount	367	Water main, gate valve, hydrant, & service line replacement	800	2022		Moore
234	0900336-11-01	Fargo	166,000	High service pump station modifications	9,343	2024		AE2S
235	0900336-11-02	Fargo	166,000	WTP residuals facility	38,246	2024		AE2S
206	0900336-21-01	Fargo	166,000	Sheyenne River Fargo emergency water supply pipeline	5,150	2023		AE2S
205	0900336-18-02	Fargo[4]	166,000	Lead service line replacement	1,200	2023		AE2S
114	3000342-20-01	Flasher	290	Curb stop & water meter replacement	350	2022		Moore
93	0700334-13-02	Flaxton	74	Water main, gate valve, hydrant, & service line replacement	455	2022		Ackerman-Estvold
52	1100345-15-01	Forbes	53	Water main, service line, meter, gate valve, & hydrant replacement	1,500	2023		Moore
82	4100357-08-01	Forman	504	Water tower replacement	1,200	2022		Interstate
38	4100357-14-01	Forman	504	Well improvements & transmission line replacement	750	2022		Interstate
46	4100357-15-01	Forman	504	Distribution system upgrades	1,030	2022		Interstate
56	2400380-19-01	Gackle	310	Water meter & pump house improvements & water main replacement	500	2022		Moore
104	2800389-13-01	Garrison	1,462	WTP improvements	5,000	2022		Moore
147	2800389-15-01	Garrison	1,462	Intake structure replacement	3,500	2022		Moore
214	2801430-19-01	Garrison RWD	1,480	Water mains, gate valves, & hydrants	1,000	2022		Ackerman-Estvold
86	2800389-13-02	Garrison[4]	1,462	Water main replacement & looping	2,500	2022		Moore
16	3000400-22-01	Glen Ullin	807	Water reservoir, transmission line, water meter, & control improvements	1,500	2022		Moore
2	3000400-19-02	Glen Ullin[2]	807	Water main replacement & looping	4,500	2022	30	Moore
96	3800397-13-01	Glenburn[4]	380	Water main, gate valve, hydrant, & service line replacement	5,500	2022		Moore
189	5000408-02-01	Grafton	4,913	WTP improvements	5,150	2040		AE2S
191	5000408-03-01	Grafton	4,913	Park River water intake improvements	2,060	2036		AE2S
187	5000408-16-01	Grafton	4,913	Raw water transmission line	6,798	2029		AE2S
190	5000408-16-02	Grafton	4,913	Red River water intake improvements	4,200	2028		AE2S
170	1800410-20-01	Grand Forks	57,122	Existing WTP decommissioning	5,150	2022		AE2S
171	1800410-21-01	Grand Forks[4]	57,365	Lead service line replacement	375	2022		-
207	2500415-12-01	Granville	330	Water main & gate valve replacement	476	2022		Ackerman-Estvold
228	5300425-20-01	Grenora	350	Water main replacement (Main St)	1,913	2023		Ackerman-Estvold
257	5300425-20-02	Grenora	350	Water main replacement (Jetson St)	622	2022		Ackerman-Estvold
212	5300425-20-03	Grenora	350	Storage tank replacement	3,435	2024		Ackerman-Estvold
95	5300425-20-04	Grenora	350	Water treatment & softening	3,118	2026		Ackerman-Estvold
229	5300425-20-05	Grenora	350	Well #1 rehabilitation	1,664	2026		Ackerman-Estvold
227	5300425-20-06	Grenora	350	Well #2 rehabilitation	1,951	2026		Ackerman-Estvold
237	3900433-20-01	Hankinson	921	Water main extension	134	2022		Bolton & Menk
238	3900433-22-01	Hankinson	921	Redundant water transmission line	1,300	2022		Bolton & Menk

DRAFT

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
15	2000446-09-01	Hannaford	150	Water tower replacement & pump house improvements	1,500	2023		Moore
27	5200458-16-01	Harvey	1,783	WTP improvements	800	2023		Moore
267	0900460-16-01	Harwood	718	Water main looping	1,000	2023		Moore
259	2900470-22-01	Hazen[4]	2,411	Lead service line replacement	1,000	2023		Moore
99	3000473-20-01	Hebron	867	Water main replacement	3,200	2023		AE2S
141	3000473-22-01	Hebron	867	Water main replacement (Summit Ave)	178	2022		AE2S
73	0100476-20-01	Hettinger	1,200	Water main, gate valve, & hydrant replacement	1,370	2022		Brosz
132	4600487-08-01	Hope	258	Water main extension	210	2022		Moore
264	0900488-15-01	Horace	1,750	Water tower improvements	400	2022		Interstate
268	0900488-16-01	Horace	1,750	Water main, gate valve, & hydrant replacement	5,291	2022		Interstate
68	0900488-18-01	Horace	1,750	WTP improvements	7,098	2022		Interstate
204	0900488-20-01	Horace	1,750	Connection to Cass RWD	1,500	2022		Interstate
70	0900452-15-01	Hunter	261	Pump house upgrades & water tower replacement	2,300	2022		Moore
118	0900452-15-02	Hunter	261	Water main replacement	3,400	2022		Moore
193	4700498-09-01	Jamestown	16,000	Remote reading water meters & software	2,835	2022		Interstate
196	4700498-13-01	Jamestown	16,000	WTP, storage, & distribution system SCADA improvements	455	2022		Interstate
145	4700498-13-02	Jamestown	16,000	WTP filter controls & filter media replacement	860	2022		Interstate
194	4700498-14-02	Jamestown	16,000	Transmission line to improve flow to NE pressure zone	4,968	2022		Interstate
172	4700498-18-01	Jamestown	16,000	Pitless unit well improvements	200	2022		Interstate
197	4700498-19-01	Jamestown	16,000	Backwash recycle system	400	2022		Interstate
198	4700498-19-02	Jamestown	16,000	Water tower improvements	350	2022		Interstate
173	4700498-22-01	Jamestown[4]	16,000	Water main replacement	1,500	2023		Interstate
12	2300508-15-01	Jud	72	Distribution system & pump house improvements	350	2022		Moore
209	1500515-15-01	Kenmare	1,013	Water main, gate valve, & hydrant replacement	575	2022		Ackerman-Estvold
252	2300535-09-01	Kulm	402	Water tower repair	100	2022		-
49	3200536-22-01	Lakota	625	Valve & ARV replacement on raw water transmission line, hydrant replacement	925	2022		Apex
162	2300537-14-01	LaMoure	889	Water main replacement & looping	525	2022		Moore
139	1000543-09-01	Langdon	1,878	Water main replacement	2,100	2022		Moore
245	1000543-09-02	Langdon	1,878	Water tower rehabilitation	475	2022		Moore
240	1000543-21-01	Langdon	1,878	Water main looping	770	2022		Moore
85	0300553-13-01	Leeds	427	Well & transmission line upgrades	500	2022		Moore
144	0300553-13-02	Leeds	427	WTP improvements	425	2022		Moore
100	0300553-20-01	Leeds	427	Water main, gate valve, & hydrant replacement (1st St S)	525	2022		Moore
165	0300553-13-03	Leeds[4]	427	Lead service line replacement	650	2022		Moore
48	2600556-11-01	Lehr	80	Water main replacement	500	2023		Moore
22	3900567-16-01	Lidgerwood	652	Water main replacement	608	2022		Interstate
149	1500571-21-01	Linton	990	Curb stop replacement	1,500	2022		Moore

DRAFT

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
161	3700574-11-01	Lisbon	2,154	Water well	200	2022		Moore
101	3700574-11-02	Lisbon	2,154	Water main replacement	2,500	2022		Moore
108	3700574-14-01	Lisbon	2,154	WTP upgrades	1,000	2022		Moore
4	0300587-22-01	Maddock	384	WTP rehabilitation & water tower replacement	3,300	2022	20+	Ulteig
14	5100593-13-01	Makoti	154	Well improvements & transmission line	400	2022		Moore
17	5100593-13-02	Makoti	154	Water main replacement	2,000	2022		Moore
271	3000596-13-03	Mandan	82,990	Distribution system improvements (Boundary Road PRV)	661	2023		AE2S
260	3000596-19-01	Mandan	82,990	Reservoir replacement	3,566	2025		AE2S
152	3000596-21-01	Mandan	82,990	Memorial Highway water main upgrade	5,500	2022		AE2S
272	3000596-21-02	Mandan	82,990	South end pump station expansion	419	2024		AE2S
176	3000596-22-01	Mandan	82,990	WTP optimization (Phase III)	6,587	2024		AE2S
255	3000596-22-02	Mandan[4]	82,990	Lead service line replacement	200	2022		AE2S
153	0900613-20-01	Mapleton	1,240	Water main replacement & looping	500	2023		Moore
80	2800619-18-01	Max	334	Water main & service line replacement	574	2022		Ackerman-Estvold
107	2800619-20-01	Max	334	Gate valve replacement	143	2022		Ackerman-Estvold
148	4900622-16-01	Mayville	1,858	WTP upgrades	790	2022		Moore
10	4200626-22-01	McClusky	380	Water main, valve, & hydrant replacement	300	2023		Moore
53	2801400-19-01	McLean Sheridan RWD	3,536	WTP & distribution system improvements	3,000	2022		AE2S
164	2801400-22-01	McLean Sheridan RWD	2,450	McClusky water tower replacement	4,200	2022		Moore
218	2801400-22-02	McLean Sheridan RWD	3,536	Service to residents on private wells in Strawberry Lake area	600	2024		AE2S
31	3200626-19-01	McVille	375	WTP improvements	1,000	2023		Moore
33	3200626-22-01	McVille	375	Water tower replacement	1,500	2023		Moore
11	3200626-22-02	McVille	375	Water main replacement & looping	9,600	2024		Moore
26	4700637-16-01	Medina	300	WTP & well house improvements	840	2022		Moore
83	4700637-16-02	Medina	300	Water main replacement	2,600	2022		Moore
91	4700637-16-03	Medina	300	Water tower replacement	1,000	2022		Moore
138	TBD-20-01	Metro Flood Diversion Authority	19,500	Existing drinking water infrastructure relocation for flood resiliency	17,500	2022		AE2S
137	TBD-22-01	Metro Flood Diversion Authority	19,500	USACE southern embankment & infrastructure	19,000	2023		AE2S
246	3200653-13-01	Michigan	345	Water tower improvements	75	2023		Moore
102	4101425-19-01	Milnor	638	Control replacement, booster station renovation, generator, water main	490	2022		Interstate
262	5100660-22-01	Minot[4]	80,000	Lead service line replacement	5,012	2023		-
210	3001431-22-01	Missouri West WS	6,230	Distribution system improvements	1,500	2022		Bartlett & West
241	3800695-14-01	Mohall	705	Water main looping	490	2023		Ackerman-Estvold
140	3800695-21-01	Mohall	705	Water main replacement	601	2022		Ackerman-Estvold
69	3900703-11-01	Mooreton	197	Gate valve replacement, control upgrades, & bladder tank storage	400	2022		Interstate
8	2100704-22-01	Mott	728	Pump house improvements & water tower replacement	2,000	2022		Moore
39	2100704-22-02	Mott	728	Water main replacement	1,500	2022		Moore

DRAFT

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54	2400715-13-01	Napoleon	707	Service to residents on private wells, water storage, well, meter, & water main replacement	2,000	2022		Moore
203	2100726-20-01	New England	600	Water main replacement & looping	840	2022		Moore
250	2100726-22-01	New England	600	Refinance of Water System Improvement District No. 2015-1, Phase 1	2,533	-		Moore
251	2100726-22-02	New England	600	Refinance of Water Replacement District No. 2016-1, Phase 2	2,499	-		Moore
177	2100726-22-03	New England	600	Refinance of Water Improvement District No. 2017-1, Phase 3	963	-		Moore
28	1900731-22-01	New Leipzig	218	Water main replacement	708	2023		Moore
29	1400732-12-01	New Rockford	1,391	Water main replacement & WTP upgrades	5,800	2022		Interstate
166	3100744-18-02	New Town	2,524	Water main & service line replacement	406	2022		Ackerman-Estvold
125	1200748-18-01	Noonan	144	Water main replacement (Main St)	748	2023		Ackerman-Estvold
72	1200748-20-01	Noonan	144	Water main replacement (Washington St)	598	2023		Ackerman-Estvold
213	5101189-19-01	North Prairie RWD	13,000	Generators at reservoirs & booster stations	650	2023		Interstate
182	5101189-22-01	North Prairie RWD	13,000	Distribution system improvements (E of Hwy 41 & N of Velva)	500	2023		Interstate
184	1001380-21-02	Northeast RWD	5,773	Service to Milton	250	2023		AE2S
160	1100758-09-01	Oakes	1,856	Water reservoir, pumping station, & transmission line	720	2022		Moore
231	1100758-11-01	Oakes	1,856	WTP Improvements	2,000	2022		Moore
232	1100758-11-02	Oakes	1,856	Well & well house replacement	400	2022		Moore
119	0300762-15-01	Oberon	104	Distribution system replacement	3,200	2022		Moore
113	0300762-15-02	Oberon	104	Well & pump house replacement	550	2022		Moore
61	0200763-09-01	Oriska	128	Reservoir & pump house replacement	550	2022		Moore
188	3100775-21-01	Parshall	903	Water main looping	670	2022		AE2S
105	3100775-22-01	Parshall	903	Water supply line improvements	9,000	2023		AE2S
242	31000798-16-02	Plaza	171	Hydrant rehab or replacement	530	2021		AE2S
274	0700800-19-01	Portal	150	Water main looping	150	2022		Ackerman-Estvold
275	0700800-19-02	Portal	150	Hydrant & gate valve replacement	100	2022		Ackerman-Estvold
87	4900803-08-01	Portland	606	Water tower replacement & water main looping	1,400	2022		Moore
236	2800825-20-01	Riverdale	226	Gate valve replacement	1,000	2022		Moore
211	2800825-20-02	Riverdale	226	Raw water supply line replacement	4,500	2022		Moore
13	2200827-16-01	Robinson	37	Pumping system improvements & water main, gate valve, hydrant, & curb stop replacement	500	2022		Moore
195	4000833-19-01	Rolette	594	Water meters and meter reading software	200	2022		Moore
122	4000834-20-01	Rolla[4]	1,280	Lead service line replacement	543	2022		AE2S
88	3500842-20-01	Rugby	7,111	WTP upgrades- Phase 3	618	2022		AE2S
92	3500842-21-01	Rugby	7,111	Distribution system replacement	2,000	2024		AE2S
40	3500842-21-03	Rugby	7,111	Raw water line & air release valve replacement	3,322	2022		AE2S
163	4100848-16-01	Rutland	163	Water main replacement & looping	600	2025		Interstate
168	4100848-22-01	Rutland	163	Water tower replacement	1,100	2024		Interstate
117	5100849-21-01	Ryder	80	Water tower replacement	1,800	2022		-

DRAFT

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
183	0200858-13-01	Sanborn	194	Water main, service line, gate valve, & hydrant replacement	650	2023		Moore
179	5100868-14-01	Sawyer	367	Water main, gate valve, & hydrant replacement	1,000	2022		Moore
159	0600869-22-01	Scranton	365	Water main replacement	1,170	2022		Brosz
230	3800877-15-01	Sherwood	256	Water main replacement	427	2022		Ackerman-Estvold
225	3800877-22-01	Sherwood	256	Water main replacement (12 block area)	1,099	2022		Ackerman-Estvold
120	1400879-15-01	Sheyenne	204	Water main replacement	3,100	2022		Moore
233	4500891-19-01	South Heart	307	Water main replacement	3,165	2022		Brosz
239	3901068-14-01	Southeast WUD	8,862	Automated meter reading system	2,000	2022		AE2S
192	3901068-20-01	Southeast WUD	8,862	WTP improvements or regionalization	12,645	2022		AE2S
199	3100898-19-01	Stanley[4]	2,400	Water main, service line, gate valve, & hydrant replacement	8,700	2021		Brosz
34	4700922-12-01	Streeter	170	Water main extension & looping	500	2022		Interstate
24	4700922-13-01	Streeter	170	WTP improvements	500	2022		Interstate
19	4700922-13-02	Streeter	170	Well & pump house improvements	800	2022		Interstate
35	4701303-19-01	Stutsman RWD	6,600	Service to Streeter	776	2022		Bartlett & West
55	4701303-19-04	Stutsman RWD	6,600	Transmission lines & WTP improvements to accommodate new well	4,264	2022		Bartlett & West
253	5100923-22-01	Surrey	1,358	Hydrant & gate valve replacement	150	2023		AE2S
143	5100923-22-02	Surrey	1,358	Distribution system upgrades (Wenz Additions)	1,400	2023		AE2S
261	5200927-13-01	Sykeston	117	Water main, corporation, curb stop, & hydrant replacement	250	2022		Moore
154	5301152-16-01	Tioga	2,500	Water main replacement	9,500	2022		Moore
254	0900945-09-01	Tower City	252	Water tower improvements	500	2022		Moore
146	0900945-12-01	Tower City	252	Water main & hydrant replacement	2,100	2022		Moore
243	0900945-19-01	Tower City	252	Refinance of gate valve & service line replacement	600	-		Moore
84	2500946-21-01	Towner	571	Connection to rural water or WTP improvements	2,060	2022		AE2S
64	2800949-20-01	Turtle Lake	575	Water main replacement & looping	1,000	2022		Moore
180	2800953-22-01	Underwood	850	Water tower & meter replacement	2,000	2022		-
66	2500956-16-01	Upham	133	Water main, gate valve, hydrant, & service line replacement	508	2022		Ackerman-Estvold
155	5101074-21-01	Upper Souris WD	1,365	Parallel pipelines, pump station improvements, & SCADA to increase flow & pressure	1,049	2022		AE2S
130	0200958-20-02	Valley City	6,585	Water main & service line replacement	825	2022		KLJ
131	0200958-21-01	Valley City	6,585	Water main & service line replacement (6th Ave NW)	500	2023		KLJ
90	0200958-22-02	Valley City	6,585	NW standpipe/water tower replacement	3,000	2023		KLJ
74	0200958-22-01	Valley City[4]	6,585	Water main & service line replacement (2nd Ave NE & 3rd St NE)	750	2023		KLJ
75	0200958-22-03	Valley City[4]	6,585	NW water main replacement	750	2023		KLJ
129	0200958-22-04	Valley City[4]	6,585	Lead service line replacement	2,000	2023		Moore
142	2500964-19-01	Velva[4]	1,265	Water main & service line replacement	604	2022		Ackerman-Estvold

DRAFT

Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
45	2300969-12-01	Verona	85	Water main & meter replacement	515	2022		Moore
58	2300969-14-01	Verona	85	Reservoir & pump house replacement	300	2022		Moore
150	2300969-19-01	Verona	85	Water meter replacement	100	2022		Moore
65	3900973-04-01	Wahpeton	7,766	Water main replacement & looping (4th St, Oakwood Court, 8th Ave S, 5th Ave N)	284	2023		
30	3900973-16-01	Wahpeton	7,766	WTP improvements	10,707	2025		Stantec
41	3900973-18-01	Wahpeton	7,766	Water main replacement (12th St & Loy Ave)	1,416	2022		Interstate
42	3900973-18-03	Wahpeton	7,766	Water main replacement (15th Ave N & 14th St N)	1,102	2024		
63	3900973-19-01	Wahpeton	7,766	Well field relocation, well house, & controls	6,654	2023		Interstate
43	3900973-18-04	Wahpeton[4]	7,766	Water main replacement (8th Ave N)	1,715	2023		Interstate
44	3900973-19-02	Wahpeton[4]	7,766	Water main and service line replacement	1,196	2022		Interstate
133	5001075-19-01	Walsh RWD	3,448	Service to residents on private wells, pipelines to increase capacity, & interconnection with NRWD	500	2022		AE2S
247	2800989-18-01	Washburn	1,313	Intake, wet well, & pump house	4,835	2022		AE2S
265	5301686-20-01	WAWSA	0	Acquisition of Williston WTP	7,155	-		AE2S
112	5301686-21-01	WAWSA	0	2022 improvements & expansion	16,500	2022		AE2S
215	5101447-16-01	West River WD	650	Service line replacement	471	2022		Ackerman-Estvold
123	0501001-09-01	Westhope	429	Water main & service line replacement	477	2022		Ackerman-Estvold
121	0501001-22-01	Westhope	429	Water main & service line replacement	1,133	2022		Ackerman-Estvold
167	5301011-20-01	Wildrose	150	Water main replacement	562	2023		Ackerman-Estvold
278	5201012-19-04	Williston	30,000	Water main improvements (47th St, 6th Ave, 44th St)	711	2023		AE2S
277	5201012-19-05	Williston	30,000	Water main improvements (Borsheim Addition)	2,266	2023		AE2S
279	5201012-19-06	Williston	30,000	Water main improvements (Front St & Reiger Dr)	1,492	2023		AE2S
280	5201012-22-06	Williston	30,000	Water main along 9th Ave	257	2022		AE2S
281	5201012-22-07	Williston	30,000	Water meter replacement	2,500	2022		AE2S
220	5201012-22-01	Williston[4]	30,000	Water main & service line replacement (1st Ave W)	257	2023		AE2S
221	5201012-22-02	Williston[4]	30,000	Water main & service line replacement (5th Ave W, phase 1)	604	2024		AE2S
222	5201012-22-03	Williston[4]	30,000	Water main & service line replacement (5th Ave W, phase 2)	627	2025		AE2S
223	5201012-22-04	Williston[4]	30,000	Water main & service line replacement (7th Ave W, phase 1)	531	2026		AE2S
224	5201012-22-05	Williston[4]	30,000	Water main and service line replacement	562	2027		AE2S
110	0801031-18-01	Wilton[4]	750	Water main replacement	8,235	2022		Moore
6	0801036-19-01	Wing	152	Water tower, water main, hydrant, & gate valve replacement	1,400	2022		Moore
21	0801036-20-01	Wing	152	Distribution system replacement	1,400	2022		Moore
77	0801036-21-01	Wing	152	Chemical feed building & equipment, decommissioning of well house & well, controls & gate valve for water tower	425	2022		Moore
216	2601037-18-01	Wishek	1,002	Water meters and meter reading software	410	2022		Interstate

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Priority Ranking	Tracking No.	System Name	Present Population	Project Description	Project Cost ($1,000)	Construction Start Date	Est. Loan Term[5]	Engineering Firm
217	2601037-20-01	Wishek	1,002	Hydrant replacement	350	2022		Interstate
116	2601037-20-02	Wishek	1,002	Iron & manganese removal equipment	1,200	2022		Interstate
106	3901043-08-01	Wyndmere	454	Distribution system improvements	1,000	2023		Bolton & Menk
76	3901043-16-01	Wyndmere	454	Service line, water meter, & SCADA system replacement	1,000	2023		Bolton & Menk
57	3901043-20-02	Wyndmere	454	Distribution system improvements (Phase II & III- from 3rd St to the west)	8,000	2023		Bolton & Menk

Total Project Cost: 742,232

[1] Twenty percent of the capitalization grant amount will be provided as loan forgiveness to disadvantaged communities. Because the actual capitalization grant amount has not yet been determined, a funding level of $2,202,200 has been assumed for additional subsidization (as loan forgiveness). Adjustments will be made, as necessary, based on the actual capitalization grant amount.

[2] These projects appear eligible for 75% loan forgiveness. The actual loan forgiveness amount is dependent upon available funds. Loan forgiveness eligibility will be confirmed when the loan application is submitted.

[3] These projects appear eligible for 40% loan forgiveness. The actual loan forgiveness amount is dependent upon available funds. Loan forgiveness eligibility will be confirmed when the loan application is submitted.

[4] These projects appear eligible for lead service line replacement loan forgiveness. The actual loan forgiveness amount is dependent upon available funds. Loan forgiveness eligibility will be confirmed when the loan application is submitted.

[5] Estimated length of the loan term only. The loan term will be set at the time of loan approval.

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Appendix C

STATE OF NORTH DAKOTA

PRIORITY RANKING SYSTEM FOR FINANCIAL ASSISTANCE THROUGH THE DRINKING WATER STATE REVOLVING LOAN FUND (DWSRF) PROGRAM

DWSRF PROGRAM
DIVISION OF MUNICIPAL FACILITIES
NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY

October 2019

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The following criteria and point system is utilized by the DWSRF Program to rank eligible projects for potential financial assistance through the DWSRF Program:

- Water Quality (35 points maximum)
- Water Quantity (20 points maximum)
- Affordability (15 points maximum)
- Infrastructure Adequacy (15 points maximum)
- Consolidation or Regionalization of Water Supplies (10 points maximum)
- Operator Safety (5 points maximum)

Maximum Total Points = 100

DWSRF funds may be used to buy or refinance existing local debt obligations (publicly owned systems only) where the initial debt was incurred and the construction started after July 1, 1993. DWSRF assistance requests of this type, if eligible, will be ranked based on the original purpose and success of the constructed improvements.

Creation of New Systems - eligible projects are those that, upon completion, will create a community water system (CWS) to address existing and serious public health problems caused by unsafe drinking water from individual wells or surface water sources. Eligible projects are also those that create a new regional CWS by consolidating existing systems with technical, financial, or managerial difficulties. Projects to address existing public health problems associated with individual wells or surface water sources must be limited in scope to the specific geographic area affected by contamination. Projects that create new regional CWSs by consolidating existing systems must be limited in scope to the service area of the systems being consolidated. A project must be a cost-effective solution to addressing the problem. Applicants must ensure that sufficient public notice has been given to potentially affected parties and consider alternative solutions to addressing the problem. Capacity to serve future population growth cannot be a substantial portion of the project.

Water Quality (select all that apply, 35 points maximum)[1,2]	
A. Documented waterborne disease outbreaks within last 2 years.	20
B. Unresolved nitrate or nitrite maximum contaminant level (MCL) exceedance(s), OR acute microbiological MCL exceedance(s) within last 12 months.	15
C. Exceedance(s) of EPA-established unreasonable risk to health (URTH) level(s) within last 4 years for regulated chemicals or radionuclides (excludes nitrate and nitrite).	10
D. Disinfection treatment inadequate to satisfy one of the following: • The Surface Water Treatment Rule (SWTR) • The Enhanced SWTR (ESWTR) • The Groundwater Rule (GWR) once finalized • Groundwater source(s) deemed by the PWSS to be under the direct influence of surface water • Multiple turbidity treatment technique requirement (TTR) violations within last 2 years (includes at least one event where the maximum allowed turbidity was exceeded)	8
E. Multiple turbidity TTR violations within last 2 years (no events where the maximum allowed turbidity was exceeded), OR 3 or more non-acute microbiological MCL violations within last 12 months.	7
F. MCL or TTR exceedance(s) (no URTH level exceedances) within last 4 years (excludes microbiological contaminants, nitrate, nitrite, and turbidity).	6
G. Potential MCL or TTR compliance problems based on most recent 4-year period (excludes microbiological contaminants and turbidity).	
75% to 100% of MCL or TTR	5
50% to 74% of MCL or TTR	4
H. General water quality problems (see table on page 5).	
Significant general water quality problem	4
Moderate general water quality problem	3
Minor general water quality problem	2

Water Quantity (select all that apply, 20 points maximum)[2,3]	
A. Correction of a critical water supply problem involving the loss or imminent loss of a water supply in the near future.	20
B. Correction of an extreme water supply problem. Maximum water available <150 gallons per capita per day (gpcd) (community water systems only), OR continuous water shortages during all periods of operation (non-profit non-community water systems only).	10

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C. Correction of a serious water supply problem. Maximum water available <200 gpcd (community water systems only), OR daily water shortages, or inability to meet peak daily water demand at a frequency of at least once per week during all periods of operation (non-profit non-community water systems only).	7
D. Correction of a moderate water supply problem. Maximum water available <250 gpcd (community water systems only), OR occasional daily water shortages, or occasional inability to meet peak daily water demands on a seasonal basis (non-profit non-community water systems only).	4
E. Correction of a minor water supply problem. Maximum water available <300 gpcd (community water systems only), OR sporadic water shortages or occasional inability to meet peak water demands (non-profit non-community water systems only).	2

Affordability (for the applicable subcategory, select one for each item, 15 points maximum)	
A. Community Water Systems	
Relative income index- ratio of local or service area annual median household income (AMHI) to the state nonmetropolitan AMHI (based on the most recent ACS 5-Year Estimates)	
≤60%	8
61% to 70%	7
71% to 80%	5
81% to 90%	3
91% to 100%	1
Relative future water cost index- ratio of expected average annual residential water user charge resulting from the project, including costs recovered through special assessments, to the local AMHI (based on the most recent ACS 5-Year Estimates)	
>2.5%	7
2.0% to 2.5%	6
1.5% to 1.9%	5
1.0% to 1.4%	3
0.5% to 0.9%	1

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B. Non-profit Non-community Water Systems	
Relative income index- ratio of local or service area AMHI to the state non-metropolitan AMHI (based on the most recent ACS 5-Year Estimates)	
≤60%	8
61% to 70%	7
71% to 80%	5
81% to 90%	3
91% to 100%	1
Relative future water cost index- ratio of expected annual water service expenditures resulting from the project to total annual operating expenses	
>20%	7
15% to 20%	6
10% to 14%	5
5% to 9%	3
2% to 4%	1

Infrastructure Adequacy (select all that apply, 15 points maximum)	
A. Correction of general disinfection treatment deficiencies - excludes improvements necessary to directly comply with the SWTR, the ESWTR, or the GWR.	3
B. Correction of well construction or operating deficiencies.	3
C. Correction of distribution system pressure problems (dynamic pressure <20 psi).	3
D. Replacement of deteriorated water mains.	3
E. Replacement of deteriorated finished water storage structures.	3
F. Replacement of distribution system piping/materials shown via DWP-approved testing to contribute unacceptable levels of lead or asbestos.	3
G. Water treatment plant operating at or above design capacity.	3
H. Water treatment plant operating at or beyond useful or design life.	3
I. Correction of specific design or operating deficiencies associated with water treatment plant unit processes (excludes disinfection treatment).	2
J. Correction of specific design or operating deficiencies associated with surface water intake facilities.	2
K. Correction of specific design or operating deficiencies associated with finished water storage facilities.	2
L. Correction of specific design or operating deficiencies associated with raw or finished water pumping facilities.	2
M. Correction of specific design or operating deficiencies associated with raw or finished water distribution system piping.	2

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N. Correction of specific design or operating deficiencies associated with chemical feed installations (excludes disinfection).	2
O. Provision of a second well where only one functional well exists for systems relying solely on their own groundwater supplies.	2
P. Replacement of inoperative, obsolete, or inadequate instrumentation or controls.	2

Consolidation or Regionalization of Water Supplies (select all that apply, 10 points maximum)	
A. Correction of Safe Drinking Water Act (SDWA) compliance problem(s) or extreme to critical water supply problem(s) for one or more PWSs through consolidation with another PWS or regionalized service provided by another PWS.	4
B. Correction of contamination problems (regulated contaminants) or extreme water quantity problems (no water, imminent loss of water supply, or continuous/frequent daily water shortages) for individual residences or businesses through consolidation with another PWS or regionalized service provided by a PWS.	3
C. Correction of potential MCL or TTR compliance problems, general water quality problems, or moderate to serious water quantity problems for one or more PWSs through consolidation with another PWS or regionalized service provided by another PWS.	2
D. Correction of general water quality problems or moderate water quantity problems (occasionally daily or seasonal water shortages) for individual residences or businesses through consolidation with another PWS or regionalized service provided by a PWS.	1

Operator Safety (select one if applicable, 5 points maximum)	
Correction of a problem that poses a critical and chronic safety hazard for operators.	5
Correction of a problem that poses an intermittent safety hazard for operators.	3
Correction of a potential significant safety hazard for operators.	1

General Water Quality (select all that apply)				
Total Dissolved Solids (TDS)		Manganese (Mn)		
500 - 999 mg/L	1	0.05 - 0.25 mg/L		1
1,000 - 1,499 mg/L	2	0.26 - 1.00 mg/L		2
≥ 1,500 mg/L	3	> 1.00 mg/L		3
Total Hardness as Calcium Carbonate (TH)		Sodium (Na)		
200 - 424 mg/L	1		200 - 424 mg/L	1
425 - 649 mg/L	2		425 - 649 mg/L	2
≥ 650 mg/L	3		≥ 650 mg/L	3

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Iron (Fe)			Sulfate (SO_4)	
0.3 - 0.89 mg/L	1		250 - 499 mg/L	1
0.9 - 2.0 mg/L	2		500 - 750 mg/L	2
> 2.0 mg/L	3		> 750 mg/L	3

Total From Above	Category for Water Quality Item H
≥ 6	Significant general water quality problem
4 or 5	Moderate general water quality problem
≤ 3	Minor general water quality problem

[1] Applies to community and non-profit non-community public water systems only. Water quality problems must be ongoing and unresolved under the present system configuration. Analysis applies to finished water after all treatment (raw water if no treatment is provided).
[2] Projects intended to address multiple community and/or non-profit non-community public water system water quality and/or quantity problems will be ranked based on the highest-level problem to be solved.
[3] Applies to community and non-profit non-community public water systems only. Projects intended mainly to increase water availability for or to improve fire protection are not eligible for DWSRF assistance. To be eligible, fire protection features must represent an ancillary project benefit or secondary project purpose.

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Appendix D

Non-Project Set-Aside and Fee Activity[1]

North Dakota Drinking Water State Revolving Loan Fund Program

Set-Aside	Set Aside Through 6/30/2021	Transferred to Loan Fund	Expended Through 6/30/2021	Balance Available as of 6/30/2021	Planned Set-Asides for 2022[4]	Total Set-Aside Funds Available 2022	Reserved Through 2021	Reserved from 2022 Allotment	Total Reserved Through 2022
DWSRF Administration	9,603,814	-	9,603,814	0	0	0	-	539,674	539,674
10% State Program Assistance									
PWSS Supervision	6,270,000	704,685	3,659,955	1,905,360	0	1,905,360	2,756,150	1,100,100	3,856,250
Source Water Protection									
Capacity Development									
Operator Certification									
2% Small System Technical Assistance	3,735,612	-	3,394,307	341,305	0	341,305	155,860	220,020	375,880
15% Local Assistance[2]									
Land Acquisition									
Capacity Development									
Wellhead Protection									
Source Water Petition Programs									
Source Water Protection	1,255,880	820,612	435,268	-	NA	-	-	NA	-
Totals	20,865,306	1,525,297	17,093,344	2,246,665	0	2,246,665	2,912,010	1,859,794	4,771,804

Fee Type	Collected Through 6/30/2021	Transferred to Loan Fund	Expended Through 6/30/2021	Balance Available 6/30/2021	Projected Funds 1/1/22 - 12/31/22	Estimated Funds Collected Through 12/31/22	Total Funds Held Through 12/31/22
Loan Fee[3]	14,915,280	0	4,389,928	10,525,352	1,905,586	16,820,866	12,430,938

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[1] The FY 1997 through 2022 allotments have been awarded. The allotment for FY 2022 is anticipated to be $11,001,000. The FY 2022 allotment will be applied for by July 1, 2022.

[2] No more than 10% may be used for any one activity with a maximum of 15% for all activities combined.

[3] The loan fee amounts reflect loans approved up to June 30, 2021. The amounts may increase based upon repayments due (if any) under loans approved after this date.

[4] DWSRF Administration is calculated as 0.2% of the valuation of the fund.

Appendix E

Amounts Available to Transfer Between State Revolving Fund Programs[1]

North Dakota Drinking Water State Revolving Loan Fund Program

Year	Transaction Description	Banked Transfer Ceiling	Transferred from DWSRF to CWSRF	Transferred from CWSRF to DWSRF	DWSRF Funds Available for Transfer	CWSRF Funds Available for Transfer
1998	DW Grant	4.1			4.1	4.1
1998	DW Grant	6.5			6.5	6.5
2000	DW Grant	9.0			9.0	9.0
2000	DW Grant	11.5			11.5	11.5
2001	DW Grant	14.1			14.1	14.1
2002	DW Grant	16.7			16.7	16.7
2002	Transfer	16.7	10.0	3.0	9.7	23.8
2003	DW Grant	19.4			12.4	26.4
2003	Transfer	19.4	0	5.9	18.3	20.5
2004	DW Grant	22.1			21.0	23.2
2004	Transfer	22.1	0	2.6	23.7	20.6
2005	DW Grant	24.9			26.4	23.3
2005	Transfer	24.9	0	0.1	26.5	23.2
2006	DW Grant	27.6			29.2	25.9
2006	Transfer	27.6	0	1.5	30.8	24.4
2007	DW Grant	30.3			33.5	27.1
2007	Transfer	30.3	0	4.9	38.3	22.2
2008	DW Grant	33.0			41.0	24.9
2008	Transfer	33.0	0	3.0	44.1	21.9
2009	DW Grant	35.7			46.8	24.6
ARRA	DW Grant	42.1			53.2	31.0
ARRA	Transfer	42.1	0	2.6	55.8	28.4
2009	Transfer	42.1	0	0.7	56.5	27.7
2010	DW Grant	46.6			61.0	32.2
2010	Transfer	46.6	0	0.8	61.8	31.4
2011	DW Grant	49.7			64.9	34.5
2012	DW Grant	52.7			67.8	37.5
2013	DW Grant	55.4			70.6	40.3
2014	DW Grant	58.3			73.5	43.2
2015	DW Grant	61.2			76.4	46.1
2015	Transfer	61.2	19.1	0	57.4	65.1
2016	DW Grant	64.0			60.1	67.9
2017	DW Grant	66.7			62.8	70.6
2017	Transfer	66.7	0	4.1	66.9	66.5
2018	DW Grant	70.4			70.6	70.2
2018	Transfer	70.4	0	22.2	92.8	47.9
2019	DW Grant	74.0			96.5	51.6
2020	DW Grant	77.6			100.1	55.2
2020	Transfer	77.6	0	1.5	101.6	53.7
2021	DW Grant	81.3			105.3	57.3
2021	Transfer	81.3	0	1.5	106.8	55.7
2022	DW Grant	84.9			110.4	59.4
2022	Transfer	84.9		**10.0**	120.4	49.4

Bold number indicates planned transfer

[1] All amounts are in millions of dollars

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Appendix F

Sources and Uses Table
North Dakota Drinking Water State Revolving Loan Fund Program
Cumulative Amounts as of June 30, 2021

SOURCES	
Federal Capitalization Grants	237,879,100
State Match	51,432,137
Transfers from CWSRF	54,590,972
Net Leveraged Bonds	193,941,728
Investment Earnings	52,004,184
Interest Payments	65,858,408
Principal Repayments	192,448,654
TOTAL SOURCES OF FUNDS	848,155,183
USES	
Administration	9,603,814
2% SSTA	3,735,612
10% DW Program Set-Aside	5,565,315
15% Local Asst. Set-Aside	435,268
Transfers to CWSRF	29,061,000
Bond Principal Repayments	74,538,703
Bond Interest Expense	70,408,214
Arbitrage	785,241
Reserves	2,650,545
Closed Agreements	706,121,802
Loans Approved But Not Closed	3,268,000
TOTAL USES OF FUNDS	906,173,514
DWSRF Funds Available for Projects in 2022	-$58,018,331

ANNUAL SOURCES FOR 2022	
FY22 Capitalization Grant	11,001,000
Set-asides taken from FY22 Capitalization Grant	-
State Match (if applicable)	28,000,000
Leveraged Bonds (if applicable)	20,000,000
Transfers with CW +/- (if applicable)	10,000,000
Total New 2022 Funds	$69,001,000
TOTAL DWSRF FUNDS AVAILABLE FOR 2022	$10,982,669
TOTAL DWSRF PROJECTS ON FUNDABLE LIST	$10,982,669
AVAILABLE FUNDS	$0

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Appendix G

Abbreviations

ACS	American Community Survey
AMHI	Annual median household income
CWS	Community water system
CWSRF	Clean Water State Revolving Fund
DWSRF	Drinking Water State Revolving Fund
EPA	Environmental Protection Agency
ESWTR	Enhanced Surface Water Treatment Rule
FY	Fiscal year
GPCD	Gallons per capita per day
GPR	Green project reserve
GWR	Ground Water Rule
IUP	Intended Use Plan
MCL	Maximum contaminant level
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDEQ	North Dakota Department of Environmental Quality
NPDWR	National Primary Drinking Water Regulations
PFA	Public Finance Authority
PRV	Pressure-reducing valve
PWS	Public Water System
PWSS	Public Water System Supervision
RFWCI	Relative future water cost index
RO	Reverse osmosis
RWD	Rural Water District

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SCADA	Supervisory control and data acquisition
SDWA	Safe Drinking Water Act
STAG	State and Tribal Assistance Grants
SWTR	Surface Water Treatment Rule
TTR	Treatment technique requirement
URTH	Unreasonable risk to health
WAWSA	Western Area Water Supply Authority
WD	Water district
WRD	Water Resource District
WS	Water system
WTP	Water treatment plant
WUD	Water Users District

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